

FACTS AND ENQUIRIES

RESPECTING THE SOURCE OF

EPIDEMIA,

WITH

AN HISTORICAL CATALOGUE

OF THE NUMEROUS VISITATIONS OF

PLAGUE, PESTILENCE, AND FAMINE,

FROM THE

EARLIEST PERIOD OF THE WORLD TO THE PRESENT DAY.

TO WHICH ARE ADDED,

OBSERVATIONS ON QUARANTINE AND SANITARY RULES.

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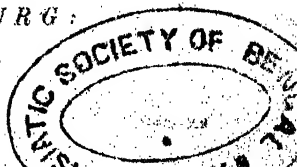
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J'ai fait pendant plusieurs années de recherches sur l'origine des épidémiques, et je suis convaincu, à la fin, qu'elles tiennent tout-à-fait à l'atmosphère. Je sais bien qu'il existe encore des médecins qui voudraient empêcher l'entrée de cette maladie par les cordons sanitaires; mais je puis les avertir d'avance, que ce serait également facile d'arrêter une volée d'oiseaux, par un cordon de glu; ou changer la course d'un orage passager, par un conducteur de l'électricité artificielle. Je vous invite donc, à dépouiller de ses ailes et de ses talons un chimère dont j'ai long temps connu le danger et l'illusion.—
Essai Sur le Cholera Morbus, par T. Forster.

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PREFACE

TO THE THIRD EDITION.

A QUESTION of great importance has for some years divided the opinion of medical as well as commercial men, respecting the source of Pestilence and the utility of Quarantine. The point at issue seems to be this—Whether pestilential diseases, such as Cholera Morbus, Plague, and others, be of such a nature that Quarantine and Sanitary Cordons can constitute a defence against their introduction into any country; or whether, on the contrary, they depend on morbid conditions of the air, which, during particular seasons, and for certain limited portions of time, visit various countries, like other atmospheric phenomena, and are incapable of being arrested by any human means? I am strongly of the latter opinion, and though under certain circumstances diseases may be extended to predisposed persons, by confinement in close apartments with those who are already infected; yet it seems to me, that facts do not warrant the belief that travellers, ships, or bales of goods, can convey such diseases into ports or countries where the specific malaria does not exist. When we consider how important, in a commercial point of view, is the decision of this question, I trust I shall be excused for repeating my claims on the public attention; while I offer to the notice of the reader such evidence as may exist on the subject, together with some curious reflections thereon. The following observations will clearly show that the source of pestilence is in the malaria of particular periods, and that it is accompanied by corresponding atmospherical phenomena.

Perhaps no epidemic period, in the memory of any man living, has presented such an assemblage of remarkable phenomena on the surface of our terraqueous globe and in its atmosphere, as the one which may be said to have commenced in Europe in the Autumn of 1828, and of which,

according to my belief, *we have not yet seen the conclusion, nor been able to measure the extent of the catastrophe which it is destined to unfold.*

I do not allude to the important political and religious struggles with which nearly the whole world has of late been convulsed, for with these the physiologist has very little to do; they would, no doubt, have interested Kepler and other early astronomers, who attributed to comets and planets the causes of those unwonted movements in the atmosphere of the earth, which, according to them, always accompanied civil commotions; but for the meteorologists of the more modern school, who have long ago rejected the doctrine of astral influence, even in the production of physical effects, such comparisons would be regarded as a useless waste of time.

What I would wish to advert to, as being connected, in my opinion, with the prevalence of pestilential and other popular diseases, is the occurrence of changes in the surface of the globe and the state in the air, which are unusual, and which, though like everything else in nature they may happen over and over again under infinite modifications at periods too distant to be measured by man, nevertheless appear to us as productions of an extraordinary condition of the elements. I have peculiar satisfaction in recurring to the following facts, because they have taken place since the first publication of this work, and they tend in a remarkable degree to confirm the doctrine which I formerly laid down respecting the origin of the exciting causes of epidemics.

In the course of our recent geological enquiries it has appeared to be well made out, that the earth is perpetually undergoing changes analogous to those which have originally produced its various strata and formations; and it appears likewise to be the fact, that there are periods of commotion in which these operations go on with an unusual force and rapidity. I call these epidemic periods, because they are attended with the spread of pestilential disorders which come in the air, and indicate the existence of its hidden and

unhealthy qualities. It was the opinion of Pythagoras, and of many other ancient Egyptian and Indian philosophers, that these times of convulsion, which occurred at long intervals, produced a complete renovation of all sublunary things, almost amounting to a new creation of beings; that after a succession of ages designated, by reference to gold, silver, copper, and iron, as having a graduated scale of excellence, the corrupted state of things, in the last or ferreous change, were at length merged in a general overthrow; after which the period of another golden age began. To these periods of change they referred to the deluge and other destructive subversions of the usual order of things.* While I admit the strict conformity of these notions to what History has proved to be the course of Nature, yet it seems that there are other periods of less importance and of more frequent occurrence, in which atmospherical as well as subterraneous phenomena occur, which mark out times of pestilence and of danger. The notion entertained by Kepler that comets were the causes of these periods is not borne out by any calculation of the attractive power of such bodies, which astronomers have made; and therefore the apparent connexion between the approach of comets to the earth's orbit, and the commotions on its surface, is reduced to a mere established coincidence: however, if these phenomena always coincide, although they be not cause and effect, yet they may naturally have a prognosticative relation, so that the presence of the one may be regarded as the indication of the other.

I shall not pursue these speculations any further at present; but after referring the reader to the historical Catalogue of Epidemics and of contemporaneous atmospheric phenomena, which I have published at page 139 of this work, and to what I said in page 90, I shall proceed to

* Refer to the fine animated and truly philosophic speech which Ovid has put into the mouth of Pythagoras, in the 15th Book of the *Metamorphoses*, and which, no doubt, is founded on the fragments of the doctrine of this great philosopher and moralist.

state some of the most remarkable prodigies of the present times, and to compare them with the prevalent diseases.

The doctrine that I have always maintained is,—That pestilential disorders of whatever character, including the plague itself, were the offspring of an unhealthy state of the prevailing air, which resulted from a derangement, more or less general, of the atmosphere which surrounds the earth. That this state of the atmosphere, which from being the exciting cause of epidemics I have called by the name of weather-bane, was evidently connected with unusual and rapid changes of heat and cold, unwonted meteors, whirlwinds, waterspouts, storms, dark vapours filling the air, fogs of unusual extent and density, and various other unusual phenomena which we call atmospheric, but particularly a distribution of the temperature over the surface of the earth, in a manner often the reverse of the usual order of things. That during these peculiar states of the atmosphere, certain tribes of reptiles, insects, and minute animalcula, frequently overspread and desolate large tracts of country, particularly in the southern and eastern parts of Europe, Africa, Asia, and in India, but also in America. That terrestrial commotions accompanied these vicissitudes, particularly changes in the state of volcanoes, earthquakes, the overflowing of rivers, and torrents from mountains, and other signs that the changes in our globe, which geology proves to be always going on, are taking place with an unusual degree of activity and force. That the epidemics which take place, apparently in consequence of, or which at least accompany, such changes, assume a diversity of character and symptoms at different times, wholly inexplicable, but which proves, notwithstanding the variety of predisposing causes in the human body, that the specific stimulant itself, which comes in the air, is very various on different occasions. That all the disorders thus excited, pursue a course wholly incapable of being arrested by any sanitary regulations; but that, at the same time, large cities are more frequently attacked than small country places; where the infectious power of the air being augmented

by exhalations from the bodies of the patients, these who come into closer proximity or contact with them, are the most likely to take the disorder; and this circumstance gives the idea of *contagion*; and is, in fact, a thing that ought to suggest the propriety of ventilating apartments, the use of the bath, and every sort of cleanliness. That on the actual occurrence of disease, in any given place, *Change of Air by removal*, is the cure most to be depended on. Whether such states of atmosphere and changes in the earth, as I have described, depend ultimately on the influence of comets, as Kepler pretended, is an abstruse and difficult question. *I, for my part, can see no possible means of explaining such influence, and I am bound therefore to refer the fact alluded to, if indeed it can be established, entirely to COINCIDENCE, and not to CAUSE.*

I desire the reader now to compare with the above statement, the phenomena which the present period presents. I consider what I call the epidemic period as having begun as early as Autumn, 1828, when that extraordinary Zodiacal Light was seen, September 29th, to stretch across the heavens. I have traced a succession of atmospheric changes since that period: the spring of 1829 became remarkably unhealthy; the mortality in some countries was prodigious: and the cold of the summer, in parts of Europe, was extraordinary. In 1829, I was at Spa in the end of May, and I remember, while engaged in examining the substance thrown out by an earthquake there, I found the cold as great as in winter; and on the morning of the 9th of June there was ice on the puddles of water by the banks of the Meuse, near to the town of Namur. I learned also from couriers, that the cold was severe all along the Rhine, and even in Austria. At Louvain, where we were on the 25th May, they told me everybody was more or less ill, and I heard the same at Aix la Chapelle, and also at Liege on the 8th of June; the air became warmer at Cambrai, and I learnt on the road that it was as warm as usual at Paris; but in Spain I find the cold was great. The winter which closed the year

1829, was one of unusual severity all over the world, even in the south of Spain, in Portugal, in Italy, in Switzerland, and even all over the Levant, and in Africa snow lay on the ground, and in most parts of Europe covered it, from November, 1829, to the end of February, 1830. The *Cholera Morbus* then broke away from India, and began its deadly course towards Europe, but did not arrive in Russia till last spring. The plague, however, broke out at Jassy, and in Moldavia severe illness prevailed. During the present year, the *Cholera Morbus*, if indeed it be rightly so named, has been making a certain progress, while milder sorts of epidemics have either been its precursors, have followed in its train, or have appeared in its outskirts! In England and France, for example, we have had the *grippe*, the epidemic cough of July last, and the affection of the bowels of August and September. Other and various epidemics are spoken of in different places in Europe and Asia, and it is well known that even in our own country various epidemic fevers still prevail, assuming different types in different places, and according to the predisponent causes in the constitution.

Let me now proceed to compare the atmospheric phenomena with these disorders. On the night of the 7th of January, 1831, a most remarkable *Aurora Borealis* was witnessed in England; the whole of the north east seemed of the colour of blood, while yellow, blue, and green light, was conspicuous in the streamers to the south and east. A still more remarkable Aurora was seen in Europe in the middle of August, and strange colours, and unusual refractions in the sun's light, have been noticed all over the Continent, while the whole of the precedent summer had been characterised by sudden changes from heat to cold, and, *vice versa*, in various countries. To the above we may add the still more remarkable fact, that a NEW VOLCANO *had broken out in the Sea near Sicily!* and that soon afterwards, Vesuvius and Aetna, ceasing to burn as before, an earthquake was felt in the midst of Italy.

On the 11th of August a tremendous tornado devastated

the isle of Barbadoes, and other parts of the West Indies, and on the 11th of September an earthquake was felt at Venice and at Parma! These are, however, only a few of the remarkable phenomena that I could relate. Rivers have burst their bounds in various parts, and inundations have been extensive. I will not swell the catalogue. They pretend, in some places, that the upper regions of the air are full of insects of an unknown character, but to this I give but little credit. This notion, however, about the insects had gained considerable ground in France; several persons on the coast about Calais and Boulogne, as well as in England, had sent up kites with raw flesh suspended to their tails, which they pretend came down covered with these flies, and the circumstance got mentioned in the papers, coupled with the French accounts of my aerial voyage. This circumstance induced me, while I was in Paris in September, 1831, to write some articles, *sur le champ*, in the foreign gazettes, contradicting the facts respecting the flies, but admitting, as I do admit, that all my experiments and observations have led me to believe that the air has been subject this year to very remarkable changes, and that insects of various sorts have been numerous. Indeed the subject of animalcular contagion has never been fully investigated since the days of Linnæus, when it seemed to promise some explanation for the remarkable variety of symptoms which different epidemics exhibit.* After all, I am more inclined to ascribe the exciting cause of disorders to changes in the state of the atmospherical electricity, which may be only a modification of animal electricity. The electric fluid seems to permeate everything, and to be the great agent in Nature: its various connexions with heat, galvanism, and magnetism, are very obscure; but recent experiments are throwing much new light on the subject, and may probably lead to the knowledge of other occult agents and modes of influence as yet unknown. In the present state of our knowledge,

* See this subject discussed in my Pamphlet on *Cholera Morbus*, &c., London, 1832.

however, we may venture to say, that whatever may be the nature of the vital power, by which the sentient capacity in all animated beings is brought into connexion with matter and the external world, it is somehow or other under the influence of those electrical powers by which the phenomena of the globe and its atmosphere are brought about. Perhaps one of the most obvious instances to allude to is the effect produced on the whole animal frame by the first occurrence of east wind. The patient subject to headache is then liable to an ephemeral migraine; various nervous disorders attack other persons, even animals feel its direful presence, and if the operations of Nature go on, yet her smiles are suspended; and in the animal machine pleasurable excitation is changed for irritability; while the philosopher finds the action of his electroscopes irregular, the effects of streams of air, and consequently of oxygen gas on flame, either stronger or weaker than usual, ditches of chalybeate water become turbid, and other effects are produced to which I need not advert. With such winds and their varieties in almost every clime, disease, irritability, and lassitude are induced. Such is the sirocco in the Levant, and such the east wind everywhere, often bringing the first symptoms of plague, of epizootic, and of famine; and indeed so general is this influence, particularly if the change take place near the lunar conjunction and opposition, that I have been induced to enquire whether in almost every variety of unhealthy weather, even when the gale below is north or south, there be not an orient current crossing it above? and whether, if we were accurately to observe it, we should not find it to descend sooner or later to the ground: before a permanent healthy gale set in and gentle Zephyr, with his moist wings, should relieve us from the hurtful stings of his antagonist, and call forth again the musky breath of flowers which spread a carpet for the steps of Flora. An accidental amusement of mine led me to the knowledge of the fact, that the upper currents do not coincide with those below, but generally succeed them.

Being accustomed on fine Sunday evenings, and other leisure days in summer, to send up small air balloons and paper kites, by way of diverting myself with their varied movements in the air, I had occasion to notice that the upper currents crossed each other in different directions, and what was of more importance, that the streams of air which had blown aloft in the evening, frequently descended before morning, in a corresponding order of succession; so that of a number of contrary currents, which the balloons might have indicated as existing above, at different heights, that which was lowest came down first, and so on of the others; and this occurred so constantly as to furnish me with a useful addition to our catalogue of prognostics, and one which may I think be made subservient to purposes of nautical convenience. This fact however shows that the current of air blowing next to the earth may not be the prevailing wind above, which in every case of malignant pestilence may possibly blow from the east, that is, in a direction contrary to the earth's rotary motion. The fact itself is indeed highly important in many points of view, as connected with the theory of whirlwinds and hurricanes. And I may here mention that there seems some evidence to prove that tempests are great whirlwinds, and have a circumvolvent motion, instead of blowing in straight lines, as is commonly imagined. A very curious paper on this subject was sent to me by a transatlantic meteorologist some years ago, which I have mislaid; but I allude to it in order to acknowledge that the first idea of gyrating hurricanes was not my own, but was suggested by his observations.

The observations which I made during my last voyage to the higher regions of the air, in a balloon filled with carbonated hydrogen, and in which I ascended to the height of near six thousand feet, fully confirm this hypothesis. For I not only found, as I had previously observed in alpine voyages over very high mountains, that the upper currents came down, but also that the currents of air moved round in a sort of gentle vortex. I was attentive during the whole

of my aerial voyage to the motion of the balloon, at least before we got too high to distinguish well the objects below, and I feel quite satisfied that we ascended in a sort of spiral course. As some very curious observations made by me during this voyage, relate to and confirm some experiments on the organs of hearing, which are detailed in the original edition of this work, I shall give some account of the voyage from my own notes. The experiment was made at Chelmsford, and we ascended from the old gardens of the Dominican Friars.

About a quarter before six in the evening of Saturday, April 30, 1831, the barometer standing at 29. 20., thermometer 63., wind gentle from ESE, the balloon being entirely disengaged from its ropes, we ascended slowly into the air, in a direction towards Writtle, over the green and fresh valley of the river Chelmer. The sensation produced by rising was both astonishing and delightful; the deception of vision, whereby the earth appears to recede instead of the balloon ascending, was, to me at least, lost in a moment, and the consciousness of mounting succeeded as we distanced the crowd and the scenery below, although no motion was felt in the little wicker basket in which we sat, which is called the car of the balloon. We were in a minute above the trees and all the buildings, the tops of which, as well as the gardens, were filled with spectators. As we were wafted by the light breeze over the valley, I could see the gentle motion of the leaves of the trees which grow along the burn; but in a few minutes more this could no longer be discerned, from our increased altitude; and as the motion of the balloon, when rising, turned us slowly round, I could not easily notice the degree of rapidity with which the angle subtended by any prominent object was diminished; the scene was constantly changing, as we turned in succession towards every part of the prospect; and my companion now observed to me, that we had the main ocean in view, and, indeed, we distinctly saw both the Thames and the sea beyond the Nore. In the direction of the Maldon river,

and hovering over its marshy lands, we saw what had evidently been a *Cumulus* now subsiding into a *Stratus* or white evening mist, stretching in such a manner over the ground in its descent, that we at first took it for smoke. Higher up there were *Cumuli* in the air, much nimboform haze still more elevated, and some waneclouds. The beauty and extent of prospect now increased, and the fields, here and there coloured with the bright yellow of the flowering colewort, green with the young wheat, or richly brown from fallows, chequered with rows of trees whose new green foliage and blossoms enlivened their darker hue, and intersected with rivers, roads, and villages, had a most enchanting effect. All earthly sounds had ceased; we had got above the breeze which swept the surface of the ground, and in a region comparatively calm, and lighter than it was below, we were conscious of no motion whatever. I presently felt a slight motion, heard the great buoyant balloon above us make a noise, as if touched by the wind, and felt a slight jogging in the car. We found that we had got into another current, and being at length nearly over the park at Writtle, we were gently wafted back again, till we came almost over the northern end of Chelmsford, where, at a very great altitude, probably near 5000 feet, we still noticed the variation of objects as we moved round with the oscillating machine. The hanging my head over the basket, and so looking down, was by much the least agreeable mode of surveying the surface of our mother earth, from whose leading strings we seemed to have burst; and would have made persons who were less accustomed than myself to be on high precipices, very giddy—a circumstance which might have been attended with much danger. I felt, however, no sort of unpleasant sensation, notwithstanding our great elevation; for the consciousness of insulation in the air makes one feel more like a part of the balloon above us than of the world below. I now experienced a sensation of pressure on the tympanum of the ear, accompanied by a snapping noise, very like what other aeronauts have de-

scribed, and which I had before experienced in a greater degree, after surmounting high hills in Switzerland, as will be found described in page 57. It was also accompanied with temporary deafness, but not by that sense of fullness which I have found so disagreeable after descending from terrestrial elevations: it is probably similar to what Lunardi, Garnerin, MM. Charles and Robert, and all the early aerial travellers who mounted very high, have described, with the exception of M. Blanchard, who does not seem to have been liable to the affection. We were still throwing out ballast, and the balloon, taking a sort of crescent course while mounting, must, as I have since become convinced, have been slowly ascending in an irregular spiral. At length, at a great but unascertained elevation, we found ourselves perfectly becalmed, and so remained for near a quarter of an hour, the motionless spectators of a vast panorama, over which the most profound and indescribable silence prevailed. Accustomed as I had been, in the course of my varied life, to all sorts of situations, in travelling, on high mountains, in boats upon the waves, or floating on gentle water, I had as yet seen nothing like this. I remember, in crossing to France, the first experience of a steam boat, paddling across the level brine like a fish, was a curious phenomenon, having before been only conveyed by sailing vessels. But this newborn Leviathan of the deep is nothing to an air balloon; neither is the sensation produced by a balloon in motion at all comparable to that of balloon at rest. Picture to yourself, reader, two persons suspended in a small basket, slung under an inflated bag of huge dimensions buoyant in the air, immediately beneath a canopy of mist, and in the elevated plane of evaporating clouds, whose grotesque forms are gradually becoming lost amid the shadows of greyhooded evening, in perfect stillness, without any perceivable motion, and looking down upon a great and apparently concave Amphitheatre, divided like a map, and made up of objects rendered too diminutive by their distance to be well defined, and which appear to have no

altitude at the great height from which we view them ;—and you may get some idea of the sensation produced by a view from a becalmed balloon. One seems, as it were, to have been divested of all terrestrial connexions, and, raised above the smoke and stir of that dim spot which men call earth, to be breathing, in delicious tranquillity, the purer ether of celestial regions.

We found at about half past six o'clock that the balloon was still gently ascending ; and at this time I became conscious again of increased altitude by a loud snapping in the ears. At length we thought it time to prepare for our descent, and, pulling the valve again, got into a faint breath of wind, probably only some stray eddy from the interstices of clouds, or the replenishing breeze of one of those slight electrical vacuums which I believe often take place in variable weather. A second or third pull made us come down more rapidly, and we were soon floating over the pine trees near Broomfield Lodge, where we got down, and landed shortly after in a field of oats.

The rapidity of the descent perhaps increased the deafness to which I have alluded, and which gradually went off before ten o'clock at night. I find the same sensation mentioned by most aerial and mountain travellers, who have ascended to any great height.*

As I have fully discussed the probable causes of this effect, I shall not repeat them here ; it probably belongs to a numerous class of phenomena in the animal economy, of which the air is the cause, and which are more or less modified by electricity. That the blood is determined to different organs by atmospherical changes there is no longer any doubt, but in what manner this is brought about is a question of difficult solution. I would recommend philosophers for the future to

* A long Catalogue of similar affections will be found in "*Medicina Simplex, or a Philosophic Enquiry into the Conditions of a Healthy Life, and Happy Old Age; by a Physician.*" London: Keating and Brown. 1832. In which work the particulars of my aerial voyage are compared with those of numerous other aeronauts

note down accurately the season in which all their experiments may be made. They should also notice the weather and the soil, and the particular Flora which belongs to it. I may here remark, that the usual division of the year into four seasons is wrong: I object to it as not being the distribution which corresponds with the real changes. There are in fact six seasons, and they respond to the same number as noticed and separately named in India and other tropical climates. 1. The *Hybernal* or Midwinter, which sets in about Advent, and includes December and January, and is a season of leaflessness and gloom. 2. The *Primæveral*, which extends from Candlemas to Ladytide, including February and March, and is marked by the increase of light, and the appearance of early spring flowers. 3. The *Vernal* or True Spring, the germinal season of buds and flowers, extending from Ladytide to the first of June, and including April and May. 4. The *Solstitial* or Summer, the season of full leaf and early fruits, and also of hay time, extending through June and July. 5. The *Aestival*, the early or hot autumn, from Lammas Day to Michaelmas, including August and September, or the harvest season, and that of summer fruits. And lastly, The *Autumnal* or late Autumn, comprehending October and November, or the vintage and wine season, as well as that of the later fruits. Each of these seasons has its appropriate atmospherical phenomena, as well as its Flora.

ESSAY.

CHAPTER I.

A GENERAL STATEMENT OF FACTS, TENDING TO PROVE THE ATMOSPHERICAL CAUSE OF EPIDEMICS.

§ 1.—*Health is perpetually influenced by Atmospheric Causes.*

ATMOSPHERICAL air, the daily support of animal life, is, according to the researches of philosophers, composed of about twenty three parts of oxygen and seventy seven of azote; any separation of these elementary components or variation in their proportions would, therefore, amount to a decomposition of the air: if the atmosphere itself, therefore, be the same everywhere, and we nevertheless speak of great variations in the qualities of the air, this apparent incongruity would deserve some explanation. . Now atmospheric air, though it be in itself one and the same thing everywhere, is capable, under various circumstances, of holding, in solution, many invisible as well as visible volatile effluvia; evaporated water, various other gases, unhealthy miasmata from marshes, odours, and many other things, unnecessary to describe, float and mix with the air; calorific rays also, as well as light, penetrate it and are again reflected into it from the earth's surface; partial rarefactions take place in it, and it moves in the character of wind; finally the seasons roll round, and in their changes effect in the atmosphere remarkable phenomena. All these things variously and conjointly impart to the air of different times and places qualities which render it the vehicle and exciting cause of innumerable changes in the animal economy.

Atmospherical electricity, of all the other phenomena of the air which affect health, is, perhaps, the most evident. To all these we may add, as links in the chain of causes, the attraction, or some other equivalent power, exercised on our globe by the moon and planets, which, though not perceived by us nor detected by instruments, is, nevertheless, very easily deduced from the ebb and flow of the tides, a phenomenon tending to prove by analogy, the effect which solar and lunar influence must necessarily have on all the moveable fluid matter of the earth. With these preliminary observations, I shall proceed to one of the most important and curious enquiries that relate to the origin of disease, in as far as it may be regarded as under the influence of the combined elementary powers to which I have made allusion.

It has been a popular notion, time out of mind, that atmospheric changes have an influence on the state of human health. And such a belief appears to be founded on reason : for, since a number of persons, of various ages, of dissimilar constitutions and habits of life, and at different places, often become the subjects of disorder at the same time, so is it rational to attribute their malady to some general cause which then prevails. And the occurrence of disorder in particular kinds of weather, or at stated seasons of the year, which some persons experience, naturally suggests the opinion that such cause resides in the air.

But it appears to me, that it is not the heat, the cold, the dampness, or the drought of the air, which is chiefly concerned in causing disorders, nor the sudden change from one to another of these states ; but that it is some peculiarity in its impregnations and in its electric state. The pain felt in limbs which have been formerly broken, previous to a change of weather, and the disturbed state of the stomachs of many persons before and during thunder-storms, are sufficient, I think, to warrant such a conjecture.

I do not deny that vicissitudes of heat and of moisture have an influence on health, but that their influence is trifling

compared to certain insensible qualities in the air, to which this Essay particularly relates.

I have observed people with weak health complain of irritability and uneasy feelings, when, after fair weather, the wanecloud has first appeared, with other prognostics of rain; and they have felt relieved after it has actually began to fall.

During what has been called unhealthy weather, when other practitioners have spoken of the general ill health of their patients, I have remarked circumstances which appeared to denote an irregular distribution of the atmospheric electricity. The manner of the distribution, and the continual and multiform changes of the cirrus branching about and outstretching its fibres in every direction; the sudden formation and subsidence of the mixed modifications of cloud in different places, and the irregular appearance of some other phenomena; the intermitted action of De Luc's aerial electroscope; strong and varying winds; and the abundance of luminous meteors by night; are the circumstances to which I allude.*

It cannot, however, be considered, that atmospheric peculiarities alone produce epidemic and other complaints: they must be regarded as having a compound origin, and as resulting from the operation of peculiar conditions of the atmosphere on persons of particular states of constitution; otherwise, all persons would be affected, which is contrary to experience. There are innumerable varieties of temperament, of general habits of life, and of predisposition to disease, which, in different subjects, vary the effects of the air. And many persons, perhaps, enjoy a state of health, and perfect action, which may be capable of resisting its evil influence altogether. It would, perhaps, be productive of useful results, if physicians would make accurate

* For particulars relative to the forms of the clouds, I must refer to my "Researches about Atmospheric Phenomena, illustrated By Figures of the Clouds, &c." 3rd Edition, London, 1823.—*And Phil. Mag. for 1811.*

meteorological registers during the prevalence of any epidemic or contagious disorders ; such as the influenza, which, a few years ago, took a range of some extent in England, and was also prevalent in other parts of the Continent of Europe.

During the time of this influenza, the unwholesomeness of the air was not only generally known, but the perception of it actually unpleasant. Some persons on going abroad suddenly declared that they were infected with disease, and so it proved in many cases, as I shall proceed to show.

But though we admit the influence of atmospheric peculiarities on the health, yet the manner and extent of their operation cannot easily be ascertained. They may deprive persons, already weak, of a portion of their electricity, and thus the energies of the brain and nervous system may be diminished : or the atmospheric electricity being unequally distributed in the air, or propagated downward at intervals, it may occasion an irregular distribution of it in our bodies, and produce an irregularity of function. But I suspect that these conjectures do not help us much to ascertain the precise cause of the influence alluded to, and we must be, therefore, contented, after enumerating facts, to bend our attention to the best mode of practise, with a view to mitigation and cure. In whatever way the nervous functions may be disturbed, a disordered action of the digestive organs will be the probable consequence ; and a state of nervous and digestive disorder being once induced, other diseases may ensue, to which there be a constitutional predisposition : this circumstance points out, while we are investigating the peculiar symptoms in each case, the safety and propriety of a more prompt attention to relieve the stomach and bowels by gentle aperient or alterative medicines.

It is not only the functions of the body which suffer from atmospheric peculiarities ; the operations of the intellect, as they depend on the state of the brain, may suffer likewise from any cause which disturbs the animal

system. In conformity to this notion, we find that the mind partakes of the irritability of the nervous system in general ; and that in particular kinds of weather, which affect the functions of the body, persons find themselves incapable of the same clear and powerful exercise of the mental faculties as they enjoy at other times. It is well known that insane people, as well as those who labour under various forms of neurosis, are worse at particular times. The brain is the instrument of mental power, as the other nerves are of what is called automatic life. It is a complicated assemblage of the organs of the different sentiments, propensities, and intellectual faculties ; and any one of these may have a morbid action, in proportion as its particular organ be disordered. And further, the organs of the brain are subject to disease similar to other parts of the body ;—to inflammation,—to morbid irritability,—to loss of tone,—to paralytic affections. They suffer, also, in common with other parts, from atmospherical causes. Hence the weather can affect the mind through the medium of the brain.

It would seem that there were a more immediate connexion between the peculiar state of the air, and the kind of disorders which were thereby excited, than what consists in the general disturbance of the nervous system and digestive organs, and the diseases which follow by sympathy, in consequence of a predisposition thereto. For it may be observed, that even of those disorders which are not generally admitted to be contagious, one particular kind will prevail for a long time. Thus, in winter, the different symptoms of the state of the body which we call a cold, appear, in some measure, to prevail and vary together ; so that it is common to hear people talking of the fashionable complaint. Coughs, for a while, are the prevailing symptoms ; sore throats are then the most common. It is in spring that certain kinds of cutaneous eruptions usually appear ; and in autumn, that those irregularities in the functions of the digestive viscera, called cholera morbus, &c. happen, and which have been erroneously attributed to eating much fruit.

Catarrhal affections, commonly ascribed to the effect of cold, are said to be of two kinds : one, the mere consequence of checked perspiration ; and the other, contagious. I believe both to be connected with atmospherical influence, though one may become infectious afterwards. The state of the digestive organs, and the previous habits of the patient, modify the complaint ; but atmospheric peculiarities seem to have great share, both in exciting the symptoms, and in producing their varieties. Horses and dogs are affected with the contagious catarrh. But grass, carrots, and natural food, given to horses, and certain alterative medicine to dogs, will often cure it.

In the year 1767, a dry cough became prevalent in Essex among horses, about Allhallowtide, which continued through great part of November, and then subsided. In the neighbourhood of Walthamstow very few horses escaped it.

With respect to what we call catching cold, I may observe, that either there must be some state of body previous to catarrh which renders it particularly susceptible of a check to perspiration, or there must be some state of atmosphere which has a tendency to excite catarrhal affections ; for persons often take cold when they are taking most care, and when they least suspect it. I have been exposed to repeated checks of perspiration, to cold, and to fatigue, and have slept exposed all night to wind and snow, during journeys in mountainous countries, without injury ; but afterwards, when living stationary, in populous cities, and taking care, I have become the subject of catarrhal complaints. Most travellers attest the same.

It is possible there may be different mixtures of atmosphere, which act as specific stimuli, and produce their corresponding peculiar diseased nervous actions, which are again still further varied in each individual case, by the particular state of constitution, and other circumstances of the patient.

Even contagious diseases break out at very uncertain periods, and often without any obvious cause, though they

are afterwards evidently propagated by infection. Parts of Turkey are visited by the plague every five or six years, while the same disorder appears more rarely in other places. The small pox rages for a time throughout whole tracts of country ; at others there is scarcely a case to be met with : the same may be observed of scarlatina and measles. I cannot persuade myself that this is merely the effect of accidental introduction, because these disorders will break out all at once in numbers over a large tract of country, prevail for a while, and then suddenly disappear. Possibly there may be some quality in the air, at particular times, whereby it is fitter for the conveyance of infectious matter. We may also suppose the effect of a peculiar state of atmosphere to be sometimes that of rendering the body more susceptible of infection than ordinary ; but these circumstances will not explain the fact I have mentioned. For if pestilential diseases be only caused by contagion ;—what at first occasioned them ? And if there be no external general cause ; why do they frequently break out so suddenly over large tracts of country at once, in great numbers, and after a time subside ?

In artificial society there are so many causes operating to produce ill health, that the extent of the influence of any one can hardly be ascertained. Inactive habits of life, bad air, irritating food, gluttony, the drinking of spirituous and fermented liquors, the misguidance of the passions, and the reciprocal operation of the mind and body on each other, have all a tendency to produce disease. But, though these various evil habits of artificial life are all detrimental, yet their kind of influence may be somewhat different : and, in proportion as families, and even nations, may have indulged, from time to time, in any of them, they may have acquired what are called constitutional peculiarities or temperaments ; and the diseases dependent thereon may be infinitely varied by the subsequent combination of different evil habits in individuals. For example, sedentary occupations have been considered to hurt our health, by causing an accumu-

lation, or irregular direction, of the nervous energy which ought naturally to be spent on the various muscles. Thus there are cases in which patients, suffering great and peculiar nervous irritation, have been relieved by a degree of bodily exercise, which, in common cases, would have caused weariness. The different kinds of spirituous and fermented liquors are, probably, pernicious, by affording a stimulus exhausting to the strength: but whether they prove uniformly injurious in proportion to the quantity of ardent spirit which they severally contain, or whether, and in what degree, the different kinds of spirituous drinks cause different specific actions, is a point which, I think, has never been sufficiently investigated.

Dr. Lambe considers ordinary food and impure water as exhausting stimuli; but he seems to think their respective actions on the system as somewhat different. If they do actually contain deleterious substances, their evil influence may be increased, in certain states of disease, by the lacteals losing their discriminating power, and, like common absorbents, drinking up unassimilated or noxious matter, in consequence of a disordered state of the chylopoietic system. In these cases, then, must attention to regimen be particularly necessary. Such a view of the subject as this, enables us, in some measure, to reconcile the beneficial effects of herbfood on many persons, with the apparent health of others who live chiefly on flesh. To return from the digression into which I have unavoidably been led: those persons are most likely to be disordered by atmospheric peculiarities who have the greatest susceptibility of constitution, and at the same time the greatest weakness.

With respect to local epidemics, I may observe that we do not know wherein consists the effect of the air of particular places on people; but, if health consist partly in the equal excitement of all the parts and organs of the body, and if particular airs excite particular organs, as some writers have thought, then do we see why a perpetual change of place may become beneficial to the health of

certain invalids, who are never long well in one place, of which I know instances.

Finally ; it was the opinion of many ancient writers, that besides occasional pestilence, there was a particular influence on the body, in particular parts of the world, in consequence of which, in those countries, certain diseases would always become prevalent ; and they usually ascribed this influence to some local peculiarity of the atmosphere. Lucretius, who was an accurate observer of nature, thus describes occasional, as well as what I call established local epidemia, and endeavours to account for the former as follows :—

Nunc ratio quae sit morbis, aut unde repente
Mortiferam possit cladem conflare coorta
Morbida vis hominum generi, pecudumque cateruis,
Expediam. Primum mollaram semina rerum
Esse supra docui, quae sint vitalia nobis ;
Et contra quae sint morbo mortique, necesse est
Multa volare : ea quom casu sunt forte coorta
Et perturbarunt coelum, sit morbidus aër.
Atque ea vis omnis morborum, pestilentiaque
Aut extrinsecus ut nubes nebulaeque superne
Per coelum veniunt, aut ipsa saepe coorta
De terra surgunt, ubi putrorem humida necta est.
Intempestivis pluviis, et solibus ieta.*

Again, in allusion to the latter or local influence—

Est Elephas Morbus qui propter flumina Nili
Gignitur Aegypto in media, neque praeterea vsquam.
Attilide tentantur gressus oculique in Aethiis
Finibus : inde aliis alius locus est inimicus
Partibus ac membris ; varius concinnat id aër.†

Virgil, the elegant imitator of his philosophical and poetical ancestors, thus paraphrases his favourite master, Lucretius :—

Hic quondam morbo coeli miseranda coorta est
Tempestas, totoque Auctumni incanduit aestu,
Et genus omne neci pecudum dedit, omne ferarum,
Conripuitque lacus ; infecit pabula tabo.‡

* LUCRET. *de Rer. Nat.* lib. vi. 1089.

† LUCRET. *de Rer. Nat.* lib. vi. 1112.

‡ VIRG. *Georg.* lib. iii. 478.

Now we ought, in every investigation, to distinguish, as far as possible, between local epidemia, that is, an inherent disposition, in the air of a particular place or country, to excite a particular train of symptoms; and endemia, or a disposition to specific forms of disease, apparently inherent in certain tribes or nations, as cancer, for instance, in many southern counties in England, particularly parts of Sussex, which seems to be an instance of hereditary endemia, and distinct from complaints produced by the air on persons who come to reside in particular places, as well as on the inhabitants, as the ague in certain parts of Essex.

§ 2.—*The Health of other Animals is affected by Atmospheric Causes.*

All organized bodies, as far as human sagacity can penetrate, appear susceptible of diseased actions, which may be excited by different causes. In man these causes are various and complicated; and the morbid actions which arise, in consequence, are numerous and dissimilar. And this circumstance may be attributed to his organization and to his mode of life. The influence of the atmosphere, which is one cause, is apt to be overlooked in the human subject, from the variety of others which are continually operating, and which, though by their conjoint influence they predispose to, and often modify or aggravate its effects, have, nevertheless, a tendency to mislead our judgment as to the manner and extent of its operation.

Animals, particularly those which are domesticated, on which alone we can make any accurate observations, have many sources of disorder, though not so great a number as man has. They may suffer from hunger, from unnatural food, from fatigue, and from accidental injury, which can produce disease, and which may be the cause of their becoming affected by peculiarities in the air; notwithstanding

their comparative freedom from the evils of intoxication, gluttony, and mental perturbation, that prove so frequently destructive to the human subject.

The occurrence of canine hydrophobia in distant parts of the country at the same time, must be ascribed partly to some peculiarity in the atmosphere; while the circumstance of its occurring at first only in a few dogs, would lead us to consider some pre-existing, and perhaps unnoticed, state of disorder in the animal, as conducive to the more violent affection subsequently excited by the air.

The effect of particular weather on animals was known to the ancients,—Virgil aptly alludes to the influence of unhealthy air on animals, though they were not subject to the general causes of human diseases, namely, wine, gluttony, and mental anxiety.

—————Atqui non Massica Bacchi
Munera, non illis epulae noenere repostae,
Frondibus et victu pascuntur simplicis herbae
Pocula sunt fontes liquidi atque exercita cursu
Flumina, nec somnos abruptit cura salubres.

There are many other instances on record of epidemic distempers among animals, which have prevailed only for a time, and which seem to be referrible to the atmosphere. A few years ago, in Essex, prevailed a mortality among cats, which carried off considerable numbers. And the well known history of the cats who died of parotitis felina, about Haywood, in Staffordshire, including the whole of a fine breed of Persian cats, is related by Dr. Darwin, in his *Zoonomia*. A similar pestilence once prevailed extensively in Holland, which destroyed this useful animal very extensively. The mange is said to be contagious; but if this be the case, it is one of those disorders which, arising from unknown causes in a great many animals at once, may be afterwards propagated by contagion. The same mode of reasoning seems applicable to the glanders of horses, and

to many distempers of cattle. The whole history of what has been called epizooty, the murrain of beasts, and indeed all the pestilences which have befallen cattle, of which history has recorded numerous instances, are illustrations of the effect of peculiar conditions of the atmosphere, acting in an occult manner on the animal machine, and inducing, at different times and seasons, very various and dissimilar morbid phenomena. Many cases of the kind will be found in the "*Electricité des Meteors*," by the Abbé Bertholon, Lyons, 1787. Many symptoms of disease in animals are immediately traceable to the state of the atmosphere. Before rain, and particularly before great falls of snow in winter, dogs appear unusually dull: their ears become inflamed, and they lay drowsily before the fire all day, and can hardly be roused. Swine seem uneasy in windy weather, and show symptoms of restlessness even before the wind begins to blow, by running about and squeaking, with a peculiar tossing up of the head; and hence the popular notion, that pigs can foresee the wind. To state at length all the various modes by which animals show their sensibility to atmospheric changes, would fill a large volume; suffice it to say, finally, that some of the most accurate prognostications of the coming weather are made from the observance of animals. These indications are well known to the husbandmen in all countries. I have collected a great many in my work on Atmospheric Phenomena, which are popular in our country, and I have collated these with the remarks of the old Greek and Roman writers, in Notes to the *Diosemeia* of Aratus, printed in the *Classical Journal*, and in my edition of Aratus.

How far electricity may be concerned in this atmospheric influence, it is difficult at present to say; but the discoveries which philosophers are daily making, relative to the extensive operation of this fluid, for fluid I must call it, till a better name be found, seem to encourage a suspicion, that its agency may be concerned in producing every change in which the atmosphere is an agent.

§ 3.—*Peculiarities of the Atmosphere affect the Life of Plants.*

Plants appear to be affected by peculiarities of the atmosphere, which do not consist in its degree of temperature or pressure. In the summer of 1810, almost all the plane trees, distinguished by the rough bark *Platanus occidentalis* became diseased in the neighbourhood of London, and for many miles round; very few of which, in comparison with the whole number decayed, recovered so far as to throw forth buds the ensuing spring; while the smoothbarked plane trees *Platanus orientalis*, and sycamore trees, *Acer pseudoplatanus*, remained healthy. The same fact was noticed also in distant parts of the country, in Ireland, in Scotland, and even in countries still more remote from our own. The season was not either remarkably hot nor very particularly dry; but there were all those circumstances alluded to in a preceding section as denoting an unusual state of the atmospherical electricity. The succeeding summer, that is, in 1811, some of the same species of plane trees were again diseased, and a few died. I am informed, that some years ago a similar, though not so extensive a mortality, prevailed among the smoothbarked plane trees. From hence would it appear, that there were particular states of atmosphere which become specific stimuli to diseased actions of particular plants. Abundant proof of the fact, that certain seasons destroy particular tribes of plants, while others remain unhurt, may be collected from various gardeners and nurserymen.

I have taken pains to examine this question closely, and I have no doubt that conditions of atmosphere, which we cannot demonstrate by instruments, arise from time to time, which cut off particular species only, and leave neighbouring species untouched.

I have on record many other facts, which it would be useless to detail, that illustrate the proposition, that there are other peculiarities of atmosphere, besides heat, cold, damp,

etc. which affect the functions and destroy the life of vegetables. This subject, however, appears to have been overlooked by Wildenow and others, who have written on the diseases of plants.

§ 4.—The Atmospherical Influence seems in many Cases to be obviously Periodical.

We call phenomena periodical which appear to take place at regular intervals of time; in contradistinction to those which seem to happen at uncertain times. We might, however, find, if we possessed a more extensive knowledge of nature, that every natural phenomenon had its particular period, and that there were a constant revolution of these periods. But we must confine this term, within our present limited views, to periods which revolve sufficiently often in the term of human life, to enable us to measure and compare the intervals between the occurrence of phenomena. "Even in this sense, I can prove, that the influence of the atmosphere on the health and illness of man, is in many cases periodical. Previous to the more minute discussion of this question, I may observe, that different states of the atmosphere, exercising their peculiar influence, may have longer or shorter periods; and the diseases caused at these periods may follow so rapidly on each other, and at such different intervals, arising from the divers terms of the periods, that we may overlook the regularity of their occurrence; the different states, too, of the human body, by varying in some cases, or altogether resisting in others, the influence of the periodical epidemic, may mislead us with respect to its existence and specific character.

With these forwarnings of the difficulty of the inquiry, I shall proceed to investigate particular periods of disease, after showing, that their periodicity is conformable to the general appearance of nature.

§ 5.—*Nature exhibits Herself in Periodical Phenomena.*

Doctor Spurzheim, of Vienna, was the first person who, during the time we travelled together, called my attention to the periodicity of nature. I had long before noticed the influence of the various states of the air on the health; but I was unaware that such conditions of the atmosphere had periods within the span of human life. He observed to me one period which excited a phenomenon of very general operation,—that for one or two days, and at the interval of twenty seven, many persons, without any ostensible cause, and without any particular complaint, felt themselves more irritable and less disposed for intellectual exertion than usual. He noticed, too, a remark of Dr. Gall on other phenomena, which occurred at this period, as for example, the female catamenia, which he asserted occurred in a greater number of women about the monthly period of irritability than at any other time.

He assured me of the real existence of this period, and that very irritable persons experienced a certain irritability at the half distance of time between two such periods. This remark roused my attention to the subject of periodicity in general. I observed that it was in this manner that the great phenomena of nature were wont to unfold themselves.

The round of the seasons was one striking example; the revival of nature in spring, her maturation in summer, the fall of the leaf and the general decay of autumn, and the winter's gloomy picture of suspended life, are monuments of periodicity. Time alone appears to me not to be the cause of the phenomena of the seasons, but something which takes place at particular times. The place of our globe with respect to the sun, the grand mover of the seasons, naturally produces other secondary agents in the atmosphere, wherein resides the periodical power exerted over the surface of the earth. That electricity is the principal of these agents I have no doubt, from numerous experiments and observations which I have detailed in another

place. Botanists have of late regarded the vernal rising of the sap and the growth of plants as effected by electrical causes. In proof of this, I may observe that I have found hail and snow, so generally the vehicle of electricity, to be more conducive to early vegetation than a warmer air, in a dry spring, or one which was attended by much unwholesome non electric rain. The learned Abbé Bertholon goes further, and asserts that plants growing near to conductors of atmospherical electricity flourish better than those that are distant from them; and he relates one remarkable instance in France in which some jasmin shrubs were planted against the side of a house, down the side of which was carried a metallic conductor of lightning. Of these jasmins, those which grew near the insertion of the metallic rod acquired three times the size of the others, and extended so high as to reach the upper windows. If this be a right explanation of the disparity of size in the shrubs, those which grew by the conductor might not only have a larger share of the fluid exerted on them; but the conductor, according to the known laws of electricity, might deprive the circumjacent air, and consequently the more distant jasmins, of their natural quantity. Seasons in which there is much thunder and lightning are the most productive of vegetable life. And the equilibrium of atmospherical electricity has been found much disturbed in seasons of epidemical pestilence. What are the remote periods of these electrical vicissitudes? indeed, what are the great remote causes of aerial changes in general; are questions which still remain desiderata in philosophy.

On the return of the seasons depend many other phenomena. Atmospherical changes take place; plants grow, bloom, seed, and fade away. Different parts of the cerebral organization of animals become active: and the instincts to pair, to nurse the progeny, to build nests, and to migrate, are roused into action. But the weather of the seasons varies in different years, and with it the times of other phenomena. These varieties of the seasons may have

periods, though too distant asunder to be noticed by man. Every thing we deem unseasonable or casual, such as cold summers, wet springs, or warm winters, may happen again and again at periods wide apart in the lapse of ages. The word season is, in our language, distinguished from weather, to denote the periodical from the casual changes of the air. But all changes would probably appear periodical, could we contemplate them through ages past and to come. To every animal a certain span of existence in the world is allotted; but in numerous individuals this time is shortened by casualties. So is it with all nature. All appears to us regularity disturbed by casualty. But all might appear undisturbed regularity to a being capable of comprehending the whole moving in harmony.

I have alluded to the general periodicity of nature. I shall now proceed to show, from those cases that take place in periods which fall within the limits of human observation, that the causes of many periods of diseases are probably atmospherical, or in other words, depending upon those external influences that produce various other natural phenomena in the universe.

§ 6.—*The Periods of many Diseases are the result of one another.*

There are many forms of disease, which from frequently occurring from time to time with great similarity, become known and designated by particular names; as the contagious complaints, measles, fevers, and other. Although one should never confound symptoms with the diseased diathesis, or peculiar morbid state of the nervous system which occasions them, yet the designation of any set of consecutive symptoms by one name, helps us in the communication of knowledge. In those forms called aguish, the quartan, tertian fevers, &c. there is a particular periodicity observed; but in the fit itself the one alternating state of the patient seems the offspring of the other. Intermitents afford an example of

periodicity as little dependent on immediate changes of the air as any we know of. But, though when the disease has once began, the periods seem no longer to be caused by the external influence of the atmosphere, still the disease itself, or that condition of body which is necessary to the symptoms, has surely been first excited, and is kept up by the action of air on a constitution predisposed thereto. If this were not the case, we should not find, as we constantly do, that particular tracts of country, as the Hundreds of Essex for instance, are remarkably obnoxious to intermittents; that these are worse in particular seasons; and that persons coming from other atmospheres are more liable to them than inhabitants. Indeed, most febrile diseases have their own particular periods, which they observe apparently independent of the epidemical or local malaria that originally called them into action.

§ 7.th—*There is, in many Diseases, a Diurnal Periodicity of Symptoms, which, from Analogy, we might suppose to be Atmospheric.*

Many remarkable cases of the exacerbations of disease, not usually considered as intermittent, returning at particular times of the day, or at stated hours of the night, are related by Dr. Darwin, in his *Zoonomia*. In one case clocks were altered with a view to deceive the patient as to the real time at which the fit was wont to return, under an idea that the periodicity of his complaints was the effect of fancy; but it proved to be otherwise; for he awoke in the night, and looking at the clock, which had been purposely set an hour too slow, expressed his astonishment that his pulse should begin to beat irregularly an hour before the usual time.

In most diseases we may notice a diurnal periodicity, if we closely watch the minutest symptoms which escape the general notice of those who are less attentive. There are many kinds of headaches, for example, which happen at stated times of the day, and which I shall treat of in a separate section on that complaint. I know a gentleman, who,

for upwards of twenty years past, has been sensible of some particular influence on his nervous system twice in the course of every revolution of the earth. He gets up in the morning apparently well, but a short time before noon begins to feel symptoms of headach, with feverishness and languor : the symptoms increase till about two o'clock, when they subside by degrees, and are too slight to be perceived by five or six.

We have reason, no doubt, to think that there are various original idiosyncrasies or peculiar kinds of constitutions, on which different stimuli act with a peculiarity of effect ; but still the exciting cause must exist, though its operation be not always the same. In the case alluded to above, there may be perhaps a particular sensibility to some diurnal influence, which does not generally operate with so much effect on the human constitution.

That there is a diurnal influence, may be learned from the observance of many vegetable phenomena : it may perhaps be the same cause which acts on the animal machine, and both analogy and experiment have led me to refer it to electricity. Flowers in general open by the exposure to the sun ; but others open and shut at particular hours of the day, even if the sun remain unclouded, as the Yellow Star of Jerusalem *Tragopogon pratensis*, and the Purple Goatsbeard *Tragopogon porrifolius*, which open their blossoms with the rising sun, but close them at noon. Other plants, particularly those of the class Syngenesia, open and shut at stated hours. The Catsear, *Hypochaeris radicata*, and many other composite flowers of this sort, close at about three in the afternoon ; some plants are under the influence of particular sorts of weather, of the approach of which they become indicators, as the Pimpernel, *Anagallis arvensis* ; it is for this reason called the Poor Man's Weather Glass. This and some other plants have their periods interrupted by the particular condition of the atmosphere. Even when the sun is shining at their usual time of opening, some plants shut their flowers, if rain be at hand ; hence they become prognostics of weather.

There is a great analogy between the phenomena of plants and those of animals and of man, resulting probably from an atmospherical influence exercised on both : and vegetable pathology serves to illustrate human. In the present instance, we can only compare the effects of a certain periodical influence on flowers, with a similar influence on a few peculiar constitutions. The above described flowers shut, and the aforementioned daily disease begins, at that very time, when, from culmination of the sun, the least effect could be produced in a given time from his variation of altitude, namely, noon. The effects, therefore, cannot be referred to the direct influence of his rays ; but may depend on some concomitant diurnal changes of the atmosphere, liable to interruption from occasional disturbing forces. Other and innumerable instances may be adduced of the diurnal periods of plants: What is called Flora's Dial, is a circular piece of ground planted with certain species of flowers, regularly arranged according to the particular hours of the day or night at which they are known to open and close their blossoms, so as to enable us to learn what is o'clock by a sort of botanical horologe.

The worst of these interesting observations is the obscurity which overhangs them. The known instruments of meteorology do not demonstrate these periodical changes. We seem to be groping in the dark after their causes. We must, however, collect, and accurately compare their effects ; not omitting, at the same time, the observance of the daily variation of the magnetic needle, and of the atmospherical electrometer.

§ 8.—*The Atmospherical Influence is overlooked, from the obscure Manner of Operation on the Animal System.*

All the phenomena of the animal machine, the various functions of automatic life, and of sensation, seem to depend ultimately on the nervous system. So do the diseases. If blood for example be determined to the head or to

other organs, what determines it thither, if not nervous influence? And are not all the selective powers of the secreting vessels dependent on those powers which we regard as essential to animal life, however modified in their actions by the nature of the parts or organs? No error is more common, or more dangerous to right practice, than that of confounding the various symptoms of disease with the morbid state of the whole constitution, wherein the real disease consists. Even cancer, for instance, veiled in a deceitful species of locality, may be regarded as the consequence of a morbid diathesis. The various symptoms of headache, vertigo, cutaneous eruptions, and local diseases in general, mark a disordered state of the nervous system and of the digestive organs. By the invigorating effect of good air and exercise on the former, combined with that of alterative medicines on the latter set of organs, we often at length subdue a variety of dissimilar symptoms of an apparently local character. The question is, how far is the influence of atmospherical causes concerned with respect to the peculiarities of the symptoms? I have noticed, that there are periods of general irritability, and that at these periods, those symptoms may be excited, to which, from other causes, the body be foreinclined. But I cannot believe that the peculiarities of atmosphere, are the only causes of the peculiarity of the symptoms, at least in many cases, and I should rather refer them to a predisposition of the constitution, roused into action, and modified by specific atmospherical stimuli. Still, even in epidemical diseases of this sort, the daily and monthly, or in other causes the intermittent periodicity is not to be overlooked, nor regarded as wholly independent of external influences.

This peculiar influence on our bodies from without, which we call epidemic, acts in an obscure manner; because its cause, not consisting in the degree of heat, moistness, or way of the wind, we do not immediately detect its presence. The electrical state of the atmosphere seems more connected with the cause of the periodicity of many

disorders, than the coldness or moisture. Registers of the different atmospherical electrosopes should be constantly made, and kept with a view of ascertaining this point. By one which I kept I found the unhealthy periods to be attended by a perpetual changing and unevenness in the action of the electricity of the air on the instrument which I employed to point it out ; and the headaches and other pains that occur at the first change of wind to the East, and which also precede or follow thunderstorms, are connected obviously with those electric changes that produce these atmospheric commotions. The most remarkable of these effects are the headaches hereafter to be described.

An observation, of the late Dr. Gall, must be repeated here, from its importance in practice, namely, that we must, in cases of disordered functions, always distinguish between the suppression, as that arising from overloaded vessels, constipated bowels, external influence of the air on perspiration,—and the exhaustion, such, for instance, as results from the constant use of stimulating liquors, or from violent evacuations. Likewise is the state of fatigue, in the most simple kind of disorder of functions, to be carefully distinguished from the two sources of disordered functions mentioned above.* Now atmospherical excitement may affect the animal functions in all these three ways: electricity may produce unequal excitement, and its consequent state of exhaustion ; unhealthy miasmeta, and air of bad quality, may overpower, suppress, or render partially torpid, the most important functions of the animal machine ; and lastly, the state of fatigue may be induced by atmospherical excitement incommensurate to the powers of the constitution. Thus the state of the air itself can aid other moral and physical causes in producing these conditions of the body which may be favourable to the influence of a more specific source of disease. In short, the very obscure manner in which the air acts on the constitution, in the production of

* Philosophisch medicinische Untersuchungen über Natur und Kunst im gesunden und kranken Zustand—von Gall, Wien 1791.

epidemic disorders, and the infinite variety of predisponent and collateral causes, have at all times rendered this branch of medical inquiry one of peculiar difficulty, even to the most experienced physicians. But this very reflection shows the great advantage which the physician must always derive from an extended education and familiar acquaintance with the various branches of natural philosophy.

§ 9.—*The Monthly Periods of Irritability should be attended to.*

It is proper in this place to consider the doctrine of certain eminent German physicians, relating to the monthly periods of irritability, which they regard as being often the times of the crisis of disease. It seems to result from an aggregate of observations made by Dr. Gall, that these periods occur twice in every lunar revolution. Certain days occur in which weak and susceptible persons in general feel worse than at other times. Epilepsy, headache, and various nervous complaints, are worse at these times; insanity also has its worst symptoms at these periods, and hence the origin of the term lunacy. My own observations have induced me to believe that if a more strict enquiry were always made into the feelings of patients, perhaps amounting to a degree of attention which would be called trifling, there would result a much more extended knowledge of the periods of symptoms than physicians generally possess. And I believe that the periods alluded to are not imaginary, but only obscure, and that they have not escaped the penetrating researches of the acute physiologists of Germany. Dr. Gall thought that the female catamenia more often occurred at these periods, that parturition were more frequent, and that, in short, all those phenomena occurred which might be ascribed, as the immediate cause, to an augmented irritability. I have observed myself that disorders whose span is spun out to a given length, and who, to use a vulgar phrase, will have their run in spite of remedies, have in fact their crisis at the period of irritability alluded to: moreover

those ephemeral headaches which come often with the east wind, are worst when in addition to other adjunct causes, the irritating change of wind happens to be coincident with the accustomed period of disorder to which this section relates. Repletion and indigestion still further enhance the effect. This is nothing more than might be expected. For as in certain constitutions, the occurrence of east wind disorders the nervous system and digestive functions, and as the recurrence of the period alluded to, renders the whole system more irritable; while repletion furnishes a local source of disturbance; so when these circumstances are conjoined, we may reasonably anticipate an increased though modified effect from the coincidence of a plurality of nearly parallel causes.

The question that naturally arises, and which brings these facts to bear on the subject of this Essay, is—how far is atmospherical influence the cause of the periodical irritability, which I have been describing. In elucidation of this enquiry it may be observed that the periods in question occur in every instance nearer to the times of the new and full moon than to either of the quadratures, and that in general they actually happen just before her conjunction and opposition;—times when an aggregate attraction beginning to influence the ebb and flow of the waters, the strictest analogy would lead us to attribute coincident effects, felt in our bodies, to the influence of the same cause exerted through the medium of the atmosphere. It may be also noted that the diurnal crises of disorders like the tides, follow the noontide or the midnight culminations of the sun or moon. From this view of the subject, we are enabled to reconcile the very antient notions of soothsayers respecting the lunar and stellar influences with practical modern philosophy. If the moon has such an influence on weather, and through it on human health; the more remote planets, when in conjunction or opposition, may add to the effect; and it may turn out, after all the contempt that has been heaped on astrology, that however abused by sub-

sequent impostors, it originally related to physical truths, which our less attentive observations have not been able so clearly to detect, as those of the wise men of old, whose knowledge was experimental, and whose psychology was deduced from the most simple, patient, and accurate examination of nature.*

I shall be able to show, moreover, when speaking of the seasons and their disorders, why certain stars and constellations got the antient reputation of being either fortunate or unlucky. For in fact they got their character from the weather of those seasons of the year, in which, from the revolution and orbit of the globe, they appeared to rise and set. Hence we read of the stormy Orion, the rainy Hyades; hence the *Oleniae signum pluviale Capellae*; and hence we learn why the mariner, conducting his bark along a lee shore, dreaded the *Saevus Arcturi cadentis Impetus aut orientis Hoedi*. Indeed the greatest part of the antient mythology seems to relate to the power of the atmosphere, though some of the gods and goddesses got transformed to the starry heavens, as Jupiter, who was ever a personification of various atmospherical effects, considered in relation to their causes, as Jupiter Tonans, Jupiter Ammon, and so on; Venus was the procreative power. Mars a figurative representation of the natural wars of antagonist or interfering powers, and the mutual destruction of living beings. Flora, Pomona, Ceres, Cybele, Febris, and others, speak for themselves: they are the powers of nature, masked in the figurative language of the East, and mistaken by posterity for living beings possessing conscious personal identity.

From a similar confusion of ideas, many birds, whose flight or particular voices betoken the coming of fair

* It may be remarked that some of the antient Christian hymns and orations, used in times of epidemic pestilence, were prayers that the sidereal influences might be repressed. Thus, in the petition to Our Lady, beginning *Stella coeli extirpavit, quae lactavit dominum*," &c. we have the prayer, "*Sidera compescere*."

weather of tempests or of pestilence were in time regarded as lucky or unlucky, and hence arose the systematic impositions of augury.*

§ 10.—*Delusion produced by the Imperfection of Terms. Necessity of discovering the true Causes of Disease.*

A good nomenclature in matters of science in general is desirable for the more easy communication of thought ; but in medicine in particular it is apt to rather mislead than to advance us in the acquirement of practical knowledge. This arises from the very compound nature of diseases, and the obscure and mixed causes from which they arise. The term Epidemia, when applied to those diseases which suddenly attack people as if from the casual descent of some external source of pestilence, has been so applied by nosologists from time immemorial. Hippocrates, Galen, Pliny, Celsus, and others, rightly enough ascribed epidemics to the morbid constitution of the atmosphere at the time. Modern observations have extended this term to disorders even of decidedly pestilential kinds ; hence the plague, the yellow fever, typhus, and numerous other definite fevers, are now, by some physicians, and I think justly, ascribed to similar causes. And disorders in general coming suddenly, and raging over extensive tracts of country during a limited period, and as unexpectedly disappearing, are properly referred to this class. But I contend that nume-

* The very commonest words in our language refer to astrology and augury. An *inconsiderate action* is an unstarconsulted doing ; and an *inauspicious circumstance* is an unbirdforeseen event. This popular superstition which is incorporated in all language, has descended to modern Europe with our fables about lot, and luck, and omens, and sorcery. A tendency has been implanted in the human mind to believe in great unseen powers, to rely on future unknown good, and to pay some tribute of worship to the inferred cause ; as a natural foundation for the Theological Virtues : and so powerfully will this feeling mix itself with the perception of phenomena, that it is only where an exclusive faith absorbs natural credulity, and confines it to its proper object, that unprejudiced philosophy is left free to exercise reason on those subjects to which alone reason appertains.

rous much slighter complaints, as certain catarrhs, inflammations of the eyes, and various other local affections of particular parts or organs of the body, should also be deemed epidemical, and that they depend on specific atmospherical causes, which act on such constitutions as are fitted to receive their influence. I believe, too, that most complaints would be sooner cured by the coassistance of a prompt removal of the patient to another situation and more congenial air, than by any of those medicinal measures alone which we adopt, and perhaps with great propriety, as having a known power over the disease. Suppose for example a particular epidemic assumes the form of an intermittent, it may be proper to give calomel and then the quinine bark, which may in time effect a cure, but a timely change of air would not only accelerate the removal of the complaint, but would cure many cases of it that the medicine would scarcely relieve so long as the epidemical influence was allowed to act on the constitution. That this observation applies extensively to innumerable forms of disease hitherto not suspected to be epidemical, it is the object of this Essay to prove by cases in point.

Experience and long attention to the subject have convinced me of the necessity of discovering, as far as is possible, whether, and in what degree, any disease that is brought before me may be epidemical. Before I had made atmospherical disorders the subject of particular study I used to be sometimes disappointed in the expected effect of medicines of acknowledged efficacy in certain disorders; and I have found that on the patient's being removed to another air, they have got well as it would seem spontaneously. And I can aver, that I am now seldom mistaken in my judgments respecting the probable effect of Change of Air in those complaints to which I particularly allude. The number of nervous complaints, too, which have yielded to Change of Air, after other remedies had been tried in vain, is much more considerable than medical practitioners would commonly imagine.

The term Endemia, which relates to diseases of particular people, or which are confined to certain local situations, is also one of very illusive meaning. It comprehends two classes of disease, essentially different from each other; namely, diseases inherent in particular tribes or families, as cancer in parts of the south of England, the goitre of some Swiss cantons, and other diseases of an established hereditary nature; and affections evidently produced by the habitual constitution of the air and soil of particular places, as agues in certain parts of Essex, in Holland, and other flat marshy countries. The antient writers, from Hippocrates to Lucretius the poet, had, as I before observed, distinct notions of the aerial cause of these local varieties of disease. In the latter class alluded to, the endemia is also atmospherical; in the former, it is impossible to say how air, in conjunction with other causes, may have both disposed the body for the diseases and roused it into action afterwards.

Remittent, intermittent, and periodical diseases in general, have been spoken of as if belonging to another division; whereas most of these and even many of their periods are the immediate effects of atmospherical causes, as I have before stated.

As change of weather, the place of the patients residence remaining the same, will, as has been shown, often cure diseases; and as change of place, the weather of each place respectively remaining the same, will have a like effect; so, from a fortunate change of weather at the time when we removed our patient, we might naturally expect an increased good effect: but in fact it is sometimes just the reverse; instances have been known, particularly in the Levant, where a patient has been removed into a supposed better air, just as the weather was changing its place; and he has, therefore, been actually carried away not *from* but *with* the epidemical pestilence without relief; while those who were left behind benefitted by the salutary change in the constitution of the atmosphere.

I believe, however, that in nineteen cases out of twenty, change would be decidedly useful, particularly if the medicinal remedies usually resorted to were not neglected. The whole history of prevalent or popular diseases, those indeed which the Germans call *Volkskrankheiten*, show, I think, that specific sources of excitement prevail for months together and then disappear, giving place before long either to other disorders, or to intervals of general good health. The year 1665 was hot and prodigiously productive of fevers in autumn: the interval of health which followed in winter was very short. Sydenham has collected a vast number of such cases in point, and has gone so far as to speak of them as dependent on the air of particular seasons and years. Thus he describes the regular small pox of 1667, 1668, and part of 1669, the dysentery which followed, and continued till 1772—the intermittent of 1661, the plague of 1665 and 1666, and so on of numerous others. His observations were often perplexed, and his practice has since been improved on, but the facts related in his works are very useful, and serve to show the ever varying nature of atmospherical excitants, since in diseases, as in every thing else in nature, there must be as many causes as there be effects, and as many relations of causes as there are relations of effects, for no effect can ever take place but from the instantaneous operation of its proper cause. But this is getting too deep into metaphysics for the practical purposes of this paper, and I shall proceed in the next Chapter to illustrate the subject by adducing some cases in proof of what has been advanced in this.

§ 11.—*Contagious Diseases differ essentially from Epidemics, but both are Influenced by Atmospherical Cause. Necessity for Discrimination. Opinion of Hippocrates.*

As I have mentioned that contagious diseases, as small pox, and others, which can be extended by contact or inoculation, are also influenced by varieties of the air in

different seasons ; so may it be deemed expedient to show wherein they differ from epidemics. The former sorts of diseases are attended with the formation of a specific poison, which, by introduction into a healthy body, can excite therein the same disease and hence reproduce the specific poison to almost any extent : but the latter, which arise from occult atmospherical causes, and are as various in their symptoms as the causes that produced them, cannot be propagated by contagion. And the doubtful question that arises, whether there be an infected air, produced by the breath and effluvia of affected persons, which would propagate the disease, has led to a discovery of great importance to practice, namely, that the most pestilential complaint, even the plague of Turkey itself, may be visited by the physician with safety, if the apartment of the patient be well aired, and too close contact be avoided. The origin of the doctrine of contagion in epidemical pestilence is comparatively modern, and Dr. Maclean, in an elaborate work on *Pestilential Diseases*, has ascribed it to Pope Paul III, about 280 years ago. It appears that his Holiness, alarmed at an epidemic which then prevailed, wished to remove the Council of Trent to Bologna, in order, if possible, not to expose the Fathers of the Council to what he imagined to be a contagious distemper. This casual opinion coming from the head of the Christian church, as the learned physician observes, spread, and was believed to be as infallible as if it had been a spiritual question settled by papal authority ; hence arose a doctrine in medicine, which was destructive of the lives of millions in all Christian countries. For so much was the supposed contagion dreaded, that even physicians and nurses were afraid to go and visit the sick ; and it has since often happened in various countries, that no one could be found to attend on the poor sufferers, but certain humane monks, the hospitaliers of convents, and the priests, who must in all probability, sooner or later, perform the last offices for the dying, and of whose exemplary courage and perseverance in such cases, the history of the Christian

church affords many bright examples for imitation. Now the priests so attending neither died of nor even caught the disease, but lived to put the physicians to shame. It is almost a wonder, that after the period when the inductive philosophy was introduced by Bacon, the true clue to these diseases were not found out again till so very lately. In 1817 I published a small treatise on *Atmospherical Diseases*; in 1819 I was examined on the subject of pestilential disease by a Committee of the House of Commons, who were at that time investigating the subject of contagion and the quarantine laws. This circumstance led me to the knowledge of the opinions and writings of Dr. Maclean, whose extensive book is perhaps the first of any consequence that appeared since the period alluded to, on the true nature of pestilence: and it is somewhat remarkable that that author and myself should have been writing on the same subject, and with similar views at the same time, while as yet totally ignorant of the occupation of each other. I differ, however in one point from that writer, for I cannot help thinking that even the contagious diseases, as I before stated, come over large tracts of country as it were spontaneously in particular seasons, and like epidemics take hold of persons predisposed by some peculiar irritability and weakness for their reception. Many of the contagious diseases, however, have this unaccounted for peculiarity, that they usually occur but once in the life of the individual, while some exhibit to us the still more unaccountable phenomenon of being defended by the precurrence of other contagions, as for example, the small pox by the vaccine. A ray of light seemed to be beaming on the obscure doctrine of contagion in the time of Mr. Hunter, when in illustration of the determined effects of certain specific poisons when once absorbed, he tried the experiment of introducing variolous matter into a body already infested with measles, and found that when the latter disease had taken its due course, as if by right of seniority of application, the former took its turn and went through the usual stages. But enquiry stopped here and we

are still left to grope after causes in the obscure dawn of medical science.

To return to epidemics : the doctrine I am upholding was clearly that of Hippocrates, who even held that all diseases came from the air. It is the doctrine too of the Indian, Arabian, and Turkish physicians, in countries more obnoxious to terrible epidemics than our own ; and so far from being new, it is a revival of antient wisdom so often overlooked by the ignorant, despised by the presumptuous, or carefully evaded by the artful quacks, and impostors of this frivolous and rapacious age.

The administration of a few simple but effective purgatives and corroborants, as mercury for instance followed by bark, and a few salutary precautions, particularly the prompt removal of the patient to another place, will generally mitigate and cure epidemics ; while in some particular cases specific antidotes may be resorted to, as I shall proceed to show ; while the incongruous nature of the remedies so frequently employed during the revolutions and vacillations of empirical practice, and the steady progress of the diseases under each, would prove incontestably, if other proof were wanting, that there is a superior and overpowering influence exercised on the body, to the progressive operation of which the disorders in question owe their origin, crisis, and cure.

The particular laws which epidemics obey, are like other atmospherical phenomena involved in much obscurity. What little I have been able to collect respecting this curious subject will be found in a subsequent chapter. Such facts as lead to practical deductions available in medicine will be there discussed, and if the philosopher should desire further information on the more curious but less useful branches of meteorology, I may refer him to "*Researches about Atmospheric Phenomena.*"

* This as well as all the other works of the Author may now be had of Messrs. Hookham, Bond Street, London, and Mr. Guy, Bookseller, Chesham.

CHAPTER II.

ATMOSPHERICAL INFLUENCE ON HEALTH ILLUSTRATED BY THE
HISTORY OF PARTICULAR DISEASES, AND THE EFFECTS OF
CHANGE OF AIR.

§ 1.—*Object of the present Chapter, illustrated by Cases of the Doctrine laid down in the last.*

IN the last chapter I have enumerated various facts in natural history as well as in physiology and medicine, to show the almost universal operation of varieties of atmosphere on health, and consequently the propriety, and indeed in many cases, the necessity of change of air in the cure of diseases. I shall, in this chapter, proceed to illustrate the doctrine advanced in the last, by introducing to the reader's notice a selection of cases of very dissimilar forms of disease, which appeared to be under the immediate influence of some prevalent atmospherical cause, in order to prove that what appeared to be a reasonable deduction from the general phenomena of epidemical disorders, was still further confirmed by the detail of others whose atmospherical origin has been less suspected. In illustrating by examples, it will appear reasonable that I should begin with those most obvious and most acknowledged epidemics, and should proceed to other disorders whose real origin is less generally known.

§ 2.—*Plague and other Pestilential Fevers known to originate in Atmospherical Causes, and hence resist Remedies.*

In addition to what I have already said of the origin of these disorders, from the state of the air, I may just notice that pestilential disorders of almost every variety visit those districts that are subject to them in tremendous numbers at once, and generally with a determined train of conscentive symptoms, over which medicines have but little controul,

but which commence, prevail, and eventually subside with certain changes of weather, or the return of particular seasons. The great importance of a right knowledge of the true nature of these disorders, will appear manifest if we only reflect on the erroneous practice which has resulted from a belief that they were caused by specific morbid poisons only to be generated by contagion. This false notion having gained general belief in Christian Europe, has induced practitioners to overlook the grand source of benefit to be found in a prompt change of local situation. The Turks, who, like the antient Greek and Arabian physicians, have less faith in medicine in cases of pestilence than the Christian population of the same countries, by sending the diseased to a distance instead of tampering with remedies of uncertain operation, have often been surprised to find their patients cured by a change to the air of the country, who had been removed as incurable from the cities and towns; where those, on the other hand, whose symptoms were less severe, and who were left in the cities where the atmospheric cause was in full operation, eventually died under its influence. This has been proved in innumerable cases, recorded in Dr. Maclean's work, of plague, of yellow fever, and other pestilential fevers. I have known it happen in typhus, scarlatina, and other fevers of less importance. But I shall glance rapidly at those complaints that have become the subject of such elaborate enquiry, and proceed to the history of others, less suspected as epidemics, which occur in our climate.

I must, however, here make one remark with respect to medicinal remedies, as it will apply generally, namely, that though certain unhealthy conditions of atmosphere may act as specific excitants on certain constitutions, requiring the removal of the patient, yet this view of the cause ought not to lead us to neglect any other modes of cure which reason may have pointed out or experience confirmed. For if the atmospherical influence in question act as a specific poison on given constitutions, certain medicines may act as a

counterbane to its effects, and may be employed as a substitute for the direct removal of the cause, where change of air is impracticable, or, where it is to be achieved, may accelerate the cure. Other medicines by their purgative, stimulant, or strengthening power, may help to fortify the body against the external cause of disorder. Calomel purges, followed by sulphate of quinine, for example, are well known remedies in intermittents, but I have found them fail, in some cases, which have nevertheless yielded to a change of situation. In numerous others, their timely administration has been a salutary precursor to the more permanent cure effected by change of air. The same observations will apply to the remedies employed for fevers of the pestilential kind.

§ 3.—*Air favours varieties of Practise, by merging the Effects of opposite Remedies in its own greater curative Power.*

One thing while I am writing of remedies may be mentioned as affording an unequivocal proof of the power of changes of air over diseases. What I allude to is the numerous, nay, I might say, the opposite character and qualities of medicines which different practitioners have employed for one and the same disorder, and the apparent success which they have severally met with by perseverance. This is only to be reconciled either by supposing the remedies employed to have been altogether inert, and the curative nîsus of nature to have in time overcome together both the disorder and the irritation of its suspected remedy, or else that there were some other and more general source of restoration, in whose greater power over the disease the minor efficacy of the medicines in question were merged. This latter would seem surely to be the more easy solution of the question; and is in fact conformable to nature and reason, and to the doctrine which I have advanced. For such overweening cause emanates in reality from a change of weather, often consisting in electrical changes that require the exercise of the nicest habitual observations to detect them.

I have repeatedly observed the fact ; and having noticed the same sudden improvement in the health to occur at periods of alteration in the electric atmosphere, as indicated by electrometers, which was also found to accrue on the removal of the patient to another locality, I think it fair logical induction, knowing what I do of meteorology, to ascribe the effect in both cases to a salutary change of air. The two cases differ from each other only in this, that in the one, the weather changed and the source of the disorder left the patient ; while in the other, the patient leaving the unhealthy air, took his leave of the source of the disorder. The case may be familiarly illustrated by supposing the particular constitution of the patient, and the particular state of the air, in a given place, as two individuals, whose temperaments could never agree together without creating a disturbance. The insufficient medicines employed may be represented by meddling friends who tried to reconcile the difference by fortifying the mind, or cooling the heat of one party, but finding their efforts unavailing, one individual may be supposed as a last resource, to say to the other--- *Well nothing will reconcile us, either you or I must leave the room.*

I have repeatedly known patients whose business rendered residence in a particular spot necessary, and who tried to weather out an unfavourable air till a change of season, by means of diet and regimen, but who at last, the salutary change not coming, were obliged to remove to a place more agreeable to their constitutions, where the use or neglect of remedies were matters of indifference, for Salus resumed her station on the brow of health, under the ensigns of a more congenial star.

§ 4.—*Intermittents and other Fevers proved to be the joint Effects of Atmospheric and other Causes. Benefit of Change of Air.*

Although intermitting, remitting, and continual fevers of certain kinds, appear frequently to result from the influence of miasmata from marshes, and often from damp

and unseasonable exhalations from water; yet it by no means follows, therefore, that they are not under the influence of those conditions of atmosphere which experiment and analogy have induced me to refer to some of the modified effects of electricity. For, in the first place, damp air is favourable to the transmission of the electric fluid, while dry air is an electric; secondly, substances thrown into and suspended in the air, may possess electric or galvanic properties, and thus exercise an influence on its electricity, exerting its influence through damp and chilling fogs, unwholesome winds, and the malaria of a pestiferous atmosphere. Difficult, however, as may be the prosecution of this enquiry into the varieties of the electric conditions of atmosphere, imperfect as are our electric and galvanic experiment on the animal machine, and infinitely various as must be the results of causes in themselves various, on constitutions so diversified by civilized life; yet it is consistent with all the phenomena of intermittents and other marsh fevers, located as they often are in certain districts, to refer their remote origin to unhealthy conditions of the atmosphere, similar to those that under different circumstances of country, season, and temperature, produce the more casual but more violent symptoms of pestilential epidemics.

Lucretius has observed, that as air is the grand supporter of vitality, so to the air's infinite varieties of combination ought we to ascribe the numberless disorders of life. With respect to these varieties, the present advanced state of natural philosophy has not as yet furnished us with much information. I confess I have gained most of the knowledge I possess of the varieties of the electric atmosphere, from the constant study of the modifications of clouds, which effect electric communications aloft; and of some peculiar instruments elsewhere described, which demonstrate the mode of the transmission of electricity to the earth.* But I shall pass over this enquiry for the present, and proceed to some practical remarks.

* See *Researches about Atmospheric Phenomena*, 3rd Edit. London, 1823.

Intermittents often change their sites in a manner quite conformable to what I have ascertained by experiment to be the change of place of electrical agents. To use the illustrative language of vulgar metaphor, I may say of them that they are belligerents against the citadel of health that are quartered for a while on certain districts, and are as suddenly ordered off, and billeted on the unweeeting inhabitants of some hitherto healthy community at a distance. But their *feuille de routes* is a secret, and in our ignorance of it we are often unable to evade their havoc—it is inscribed in mysterious characters among the marching orders of the winds, but particularly of the terrific East, from whose misty plumes dire experience has taught the inhabitants of all countries of the globe to fear the fall of pestilence in the autumnal season; while Zephyr in reviving spring, fans onward with his musky wings the soft and congenial breezes of health. In this county of Essex, places which for successive seasons were visited by agues in abundance, have become almost free from them, while they have appeared in others formerly exempt from their attacks. The parish of Boreham was for a long time free from intermittents, but last winter I had abundant experience of their prevalence here. Prittlewell and Rochford were once the head quarters of the ague; at other times they were almost exempt from it. I only adduce these few instances as being near home. I have collected and examined innumerable instances of a similar metoicesis of the disorder in various countries.

The same may be said of that mysterious fire the *Ignis fatuus*, which shifts its quarters after prevailing for a long while on one marshy swamp, and betakes itself to another. This phenomenon is proved to be the modified electricity of low and boggy ground. It differs from the numerous little meteors and falling stars which happen in clear frosty nights, above a fine wholesome dry electric air.

It is pleasant and useful in this instance to compare phenomena whose electrical origin, as yet, is only probable, with others in which it is fully established; because

the comparison tends to strengthen our suspicion that both may be derived from similar atmospherical causes, and thus confirms the important hypothesis, which it is the object of these pages to establish.

I shall conclude this section with observing, that in removing patients labouring under obstinate agues to distant places, we shall give them the greatest chance of benefit from change of air, if we advise their removal in a direction at right angles to the prevailing wind : indeed this observation holds good in all cases where change of air is directed, for epidemics generally go along with the wind. In proof of this I have made a remark of great importance. The east wind is the well known harbinger of woe : it may be defined to be a wind moving in a direction opposite to the rotatory motion of the earth's surface.* For some reason or other, this wind is unwholesome in every part of the world. When it first blows, the change is marked by the accession of numerous morbid phenomena, and an ephemeral headache, the product of the first day of east wind, is well known, and when aggravated by adjunct causes, and a proximity to the periods of new or full moon, is often tremendously violent. An epidemical intermittent often sets in with an east wind, and in some cases is difficult of cure during its continuance as is observed both in England and in Holland. For the site of the fever remains in the wind, and even its particular type seems to depend on some atmospherical peculiarities of the season in which it prevails.

The most successful practice that I have adopted in intermittents is to purge with calomel, in proportion to the strength or wants of the patient, so as to clear the alimentary

* Thus it is distinguished from the north wind explained by the rush of cold air from the polar regions towards the equator to fill the vacuum produced by the rising of heated air about the tropics. The north wind then; and the east or wind of the difference between the rotatory motions of the earth and atmosphere, are the two most easily explainable currents. For a valuable history of the others I refer to a scarce Treatise "*Sur les causes generales des vents*," by D'Alenbert, a work I formerly possessed, but which I believe was sent to the Library at Stoneyhurst.

canal, and excite the action of the liver, and then to give the sulphate of quinine to the amount of ten grains in a single dose just before the expected return of the fit. This practice has been successful in the majority of cases, and I think it right to mention it for the good of others. There are cases in which it cannot be resorted to with propriety : I have learnt to discriminate those by habit, and in such instances change of air will often put an end to the complaint. The known remedies alluded to likewise often only stop a train of intermittent symptoms for the time, the source of the disorder remains, and until the weather or the situation of the patient be changed, the apparent cure turns out to be only a truce between the febrific agents and the body. Finally, the most inveterate cases will sometimes subside of themselves, on a sudden change of air, while the cure is attributed to various and often ridiculous remedies. In elucidating the morbid influence of east wind, I may observe, that on first blowing it often seems loaded with vapour, which it seems to take up by producing an extraordinary exhalation from the waters and marshes over which it blows : that vapours in themselves unwholesome, may become the vehicle of electrical effects on the body is also probable, and thus we may get a clue at once to the connecting links in the chain of causes by which the ultimate effect on the health is produced. Another thing, too, which favours my suspicion of there being a moveable medium of electricity in east wind is, that on nights which at first appear the clearest, when the wind is in that quarter, one cannot make a good astronomical observation, for the star seems to dance about in the field of the telescope as if some vibratory motion in the air, such as might be produced by electricity acting on an imperfectly conducting medium, produced an irregularity in the refraction, and consequently an unsteadiness in the apparent place of the luminous object.

An important observation, results from my observations on east wind,—that invalids should avoid situations much exposed to it, particularly those to leeward of stagnant and

filthy waters, from whose surfaces east wind may exhale pestiferous effluvia in the manner above described ; and should, in the absence of an eastern shore where this wind might be mollified by the expanded surface of the ocean, seek out a mansion sheltered by an eastern hill or wood, and exposed only to the milder gales of the west.

The proofs that I could adduce of the power of change of air over intermittents from cases which have come under my own care are too numerous to be detailed here. I have, at the same time, in common with other practitioners, numerous proofs of the efficacy of other remedies, particularly calomel and bark, when administered in the form to which I have before alluded. A repetition of cases would be only tedious, while a succinct allusion to them may serve to explain my opinion on the subject. In numerous cases the sudden relief afforded by the medicines showed that they had a power to fortify the body against the prevailing source of the disease, and thus to place the patient with respect to the atmosphere on the same footing as other healthy persons, while in those cases in which the medicines failed of their effects, there was probably a greater degree of weakness and susceptibility to the peculiar morbid excitement, which only change of air could remove.

§ 5.—*Bilious Fever and Hypochondriasis considered as often Epidemical, and the consequent Power of the Weather to affect the Mind.*

When diseases which are manifestly the result of one obvious cause appear on enquiry to be influenced by another, it becomes a natural subject of enquiry whether and to what extent the two causes may concur in the production of the effect. I shall take an example in what is called bilious fever, and its frequent consequence hypochondriasis, as this is a case in point. In persons predisposed to this complaint, irregular living, repletion particularly of certain oily foods, and the intemperate use of strong drinks, will lead to those fevers which seem to be sympathetic with a

disordered condition of the liver and other digestive organs and a redundant and vitiated secretion of the bile. The brain, which always more or less sympathises with the liver, becomes disturbed in its action, and that in a very peculiar manner, a train of symptoms frequently supervening of a most distressing nature ; the patient becomes irritable and desponding, and though the particular subject that irritates, and the particular objects dreaded in the fits of despondency, vary according to the organization of the brain, and to the effects of education ; yet the exciting cause is the same ; and the etymology of the terms used in nearly all known languages to designate it, prove that it is obviously hepatic irritation. The Greeks called this disease *Ἰποχονδριστις*, when an obvious disorder of the part in question laying *υπο χονδριον* by its acute disease, produced the temporary state of mental irritation, accompanied by fearful impressions and often with spectral illusions by which the mind seems spellbound. A more slow and continued gloom, from the dark biliary secretions which habitually accompanied it, they called *Μελαγχολικ*. The Romans called the same complaint *Atrabilia*, from whence the French and Italian names are derived. The German *Schwartzgalichkeit*, has the same import, signifying black bile, and I am informed that in Arabic and in the Oriental Languages, as well as in ours, the same words, which in ordinary language signify melancholy, are employed ædically to designate this disease, and have an etymological reference to a disordered liver. The Italian *Fegato* the liver, just to mention another example, gives the adjective *fegatoso*, which means overburdened with dullness. The language of popular sarcasm, at all times ready to avail itself of forcible metaphors, laid hold of this striking connexion between a courageous self possession of mind and a healthy liver, and the contrary effects of cowardice and debility with an erroneous state of the bile ; hence the poltroon, whom an Athenian satyrist would have called *Λευηπατίης*, would be designated as a lilylivered rascal at Billingsgate.

The Teutonic and Saxon words for liver, too, have the same root as the word life, and imply the vital importance of this the largest viscus of the body. The antients, as we have seen, became very early acquainted with these facts. The poets of Rome, Juvenal, Persius, and others, have often alluded to it, and Horace's celebrated Ode to Lydia, in which he depicts the whimsical anguish of a jealous lover is almost a medical description of hypochondriasis.* In this Ode the liver, tumified with obstructed bile, the change of colour in the countenance, and of emotions in the mind, and the ultimate relief by a flow of tears, are what ordinarily happens in a paroxysm of that Promethean malady of which disorder of liver, and its sympathetic febricula, is the acknowledged cause.

I would cite numerous other examples of the same sort out of the storehouse of academic recollections, were it not that I hate the pedantic abundance of classical quotations in matters of science, and wish to get on with facts, in order that what I proposed to show in the onset of this section, may, by a select detail of cases, be satisfactorily proved in the sequel.

I would be understood then to speak, not of the idiopathic melancholy of a diseased organization of brain, but of hypochondriasis accompanying bilious fever, when I assert that atmospherical causes concur with mental perturbation and excess in diet in the production of this malady, and that where this is the case, the symptoms will not yield to the ordinary remedies.

In 1810 a bilious fever of this kind was epidemical on the north side of London ; it began before Michaelmas and ended about Christmas. During its prevalence, various forms of nervous disorders became obstinate, and resisted the common means of cure. I perceived, during this period, an unusual appearance of those clouds whose office is the conducting of the electric fluid, and the new and improved electrometers then in use pointed out a remarkable dis-

* Quum tu Lydia Telephi, &c.

turbance of the atmospherical electricity. I could relate similar instances in the epidemic on the coast of Picardy, and in others in England.

When I was a pupil in St. Bartholomew's hospital, Mr. Abernethy used, in the anatomical lectures, to relate his own case. He related that once upon a time, being in a state of hypochondriasis, brought on by great exertion of body and mind, he cured it suddenly by taking five grains of blue pill ; and he recommended us to employ mild mercurial alteratives in cases of suspended and depraved biliary functions attended with low spirits. I have employed these means in ordinary cases with success, but I have also seen instances of melancholy, so obviously caused by the air of a particular place, or the recurrence of a particular season, that I have felt little or no surprise in finding these remedies to be unavailing. In some persons the aversion to particular airs is habitual. I know those who cannot feel in spirits in parts of Sussex, which agree particularly with the generality. Others feel depressed whenever they are on clay, or near marshes, while persons are not wanting in whom a residence in the fine chalky soils and salubrious air of Hampshire and of parts of France proves a source of listlessness and ill health. There are idiosyncrasies about airs, as well as about aliments. The individuals alluded to are, in respect to particular atmospheres, what others are in respect to diet, who cannot eat fish, mutton, cucumber, honey, and various other common articles of food. The passions, too, afford parallel cases, in the singular sympathies and antipathies of sentimental minds.

It must be here observed that the depressing influence of particular airs on the mind is not half so violent as that which comes of an epidemical fever. In the latter I once participated in my boyish days, and with my case, as it led to some curious reflections of which abler minds may avail themselves, I shall conclude this section. I was taken ill of a bilious fever in autumn, so mild in its ostensible symptoms that it was hardly recognized as an

illness. The disordered action of the digestive organs and irregularities of bile were continued through August and September till the biliary secretion was suspended in October. It was then for the first and only time in my life that I ever felt lowness of spirits. Infantine recollections seemed to break out on me from the camera obscura of memory, and a comparison of the past and the present seemed to predict an increase of cares. Speculating as I am ever wont to do on what is passing in the animal economy, I began to reason on the cause of the change; and what I at first called bad spirits seemed to result from an acuminated sensibility to impressions, and at the same time a propensity to select disagreeable objects of expectation and to magnify the anticipated evil. In this state, the choice of a profession, the uncertainty of the life of friends and relations, and the unavailingness of all medical efforts to avert the one day to come finishing stroke of mortality, all which every body must feel sometimes, were subjects of meditation that occupied the mind with an undue force; even metaphysical speculations worried me; and certain false dogmas of the schools seemed to rouse a sort of Quixotic disposition to subdue them. I was actually annoyed at the advanced post which Berkley the sophist of Cloyne seemed to have gained in his ideal system; as well as at the danger encountered, in trying to prove the true inductive philosophy, from the difficulty of establishing the requisite *postulatum* of the necessary union of cause and effect. These trifles were certainly men of straws, which a febrile epidemic built up, but which I found I must await the return of health to knock down.

While a disposition to lean to the shadowy side of the sublunary picture lasted, I found that I could not hope; and this led to a piece of useful philosophy on which I stumbled, namely, that, to certain minds at least, without hope in the future, the present cannot be enjoyed. From this *excessu* I was relieved as vigour returned: and some of the profound meditations of St. Augustine and other early writers suggested to me the following ideas, which I only

mention as they tend to establish a curious coincidence of physiology with religion, in the history and importance of certain sentiments. The advantage of hope seemed to vary directly as the absolute value of the thing hoped for multiplied into the probability of its occurrence. Thus it appeared to me, that however distant or unlikely sceptics might imagine the acquisition of heaven, its immeasurable absolute value, arising from its eternity, must always render the multiple of infinite advantage. This seemed then to be the sustaining prop of every body in the chequered troubles and fleeting joys of life ; while on the other hand the converse application of the same argument would always convert the chance of hell into a powerful antidote to vice, however little the likelihood of such a doom. To be balanced between the two in the varying scale of hope and despair has, in every age and country, been preferred by the bulk of mankind to the evanescent shadows of the atheistical philosophy. Metaphysics fail to establish any thing certain as to the future, for want of axioms that can exist independently of credulity in the first instance ; while expectation so necessary to happiness relates to the future alone ; of which we really know nothing except from an authority that has belief for its source, and that promises no benefit hereafter but as a reward of virtue. And thus we have a clue afforded by reasoning to what is meant by those who assure us that there is no solid happiness but in Faith, Hope, and Charity. Thus also do we see why, *cæteris paribus*, there will always be more happiness in countries where there is less heresy.—An inference we may surely draw from that inevitable law of our nature, above explained, by which the present falls in value so infinitely short of the past and to come as matter of conscience or subject of hope, that, in every mind, enjoyment of the present must vary, other things being the same, directly as the undisturbed anticipations of happiness in future. The universal application of this principle, and the close connexion between the loss of a power to hope, and a disorder often epidemical and always nervous, must plead my apology for introducing here subjects which

§ 6.—*Of Small Pox, Measles, Scarlatina, Hooping Cough, and other definable Fevers, considered with reference to Atmospheric Influence—tendency of Diseases to participate in the prevailing Type of the Season.*

When it is asserted that any disease is epidemical, nothing more is conveyed by the assertion than that it is capable of being excited by a peculiar constitution of atmosphere on many persons at once ; but it does not follow that the same disease shall have no other source of propagation. A disease may be defined to be a particular train of morbid actions in the animal machine, but those actions may have more than one source of excitement. There are contagious and non contagious epidemics, and of the former sort small pox constitutes one of the most remarkable. This and some other diseases, though originally epidemical, are evidently capable of being extended also by contact and inoculation. Diseases which have this twofold source of prevalence may be compared to plants that are propagated by seed and by root. There is also another curious analogy to be noticed in this fanciful comparison. The epidemic dissemination of a disease from the air at different times produces varieties in the most important features of the disease ; but the cases extended by contagion generally imitate closely the symptoms of the case from which they sprang. Just as in plants we get new varieties from the lusus of seeds, while the offsets of the bulbs preserve the closest likeness to the parent. Inoculation, too, like grafting, has a tendency to reproduce features like those of the cions, rather than those of the stock, though the fluids of the latter modify in some measure the compound product.

The epidemic small pox of 1670 and the two following years, as described by authors, was of an anomalous kind. It broke out in numberless cases at once, all distinguished by a confluent tendency and attended with unusual large vesications of the skin ; but all the cases spread afterwards by contagion partook of the same character. The remarkable change in the constitution of the air in 1672 put an end to it.

It would seem as if different epidemical excitants could float in the atmosphere at one time and select their victims according to the predispositions of individuals, for several diseases will become epidemic in the same season, in places not far distant, and not unfrequently in the same place. Sydenham has related so many cases of this that I forbear to occupy the reader's attention with a repetition of facts well known. Besides specific diseases, it seems too that in particular seasons and at uncertain times disorders in general partake more of an acute inflammatory nature ; at other times incline to a low and what is called nervous kind. In some seasons and in some places fevers are found to be continuous ; at other times, or in other places, there is such a tendency in even the most local as well as the most dissimilar symptoms to observe remitting or intermitting periods, that patients have become themselves aware of it, and have got relief, by a recourse to the bark, from local complaints never before suspected to be aguish. Of these facts instances shall appear in the sequel to this Essay. To return from this digression to specific contagious complaints—I may observe that the bulk of the works of Sydenham and Meade are made up of descriptions of the casual visitation and circumscribed range of particular disorders of so decisive a character as to leave no doubt of their having originated in specific atmospherical excitement. The measles, the hooping cough, the epidemic cough, the pleurisy of 1675, and the scarlet and other fevers are cases in point. While we are contemplating all these curious facts, we are never to lose sight of our practical duties as physicians, nor to be dismayed, be the source of the disorders, so as to relax our endeavours to apply the knowledge of antidotes, which kind nature has pointed out, and with which the earth and the vegetable kingdom in particular so amply abounds. The extended knowledge of chemistry, mineralogy, and botany in the present age, opens a wider field for fresh pharmaceutical enterprises ; and when we reflect on the immense use of those sciences, which bear so closely on the welfare of the physician from their

utility in practice, and the important discoveries they may lead to, there is no apology left for pursuing an ignorant crafty and commercial policy in the practice of our calling, or omitting to make ourselves acquainted, as far as lies in our power, with the collateral branches of science. Who would have thought in the time of Hippocrates, that the severer symptoms of atmospherical intermittents might be successfully interrupted by the bark introduced in the seventeenth century by the Jesuits ? or that a pestilential animal poison like small pox could be prevented by the introduction of a counterbane secreted by the disordered vessels of a cow ? My object is not to undervalue remedies, nor to check the labour of the pharmacologist ; but, by pointing out the great atmospherical source of disorders, to recommend the more general employment of change of air as an adjunct remedy.

§ 7.—*Of the Disorders incident to certain Individuals in the several Seasons.*

As there are some persons who are always ill in autumn and others who are never well in spring, it has occurred to me to enquire whether their respective maladies might arise from some autumnal and vernal effects of atmosphere which existed every where in those seasons, or whether they belonged to particular countries. For the former case a remedy has been humourously proposed for the affluent in migration. Those who could not bear the autumn might cross the tropics southward, after Midsummer, to be ready for an antarctic spring ; while those to whom the vernal air was insalubrious might fly the septentrional regions after the winter solstice. The natural year of the one party would then consist of two springs and two solstices, that of the latter of two solstices and two autumns. The one would migrate before the swallows and the other lead the van of the woodcocks. They might hail each other in passing at the equator, and enquire what particular epidemics might be raging in the countries whither they were bound, and might be directed thereby in their choice of a situation.

Certain it is that many persons always get ill in spring in Europe, while others are as regularly effected in autumn. Some are effected at both seasons with complaints that belong to each respectively. Thus I have known people, who were wont to have eruptions in spring suffer from diarrhœa in autumn. On the whole the solstices are more wholesome than either equinox.

But the above change of place almost ludicrous in itself could only be available to the very opulent, and would be attended with the risk of the difficulties and dangers of a long voyage. Again it is chimerical as a real practice. But the fact is that those persons who are subject to the disorders of the respective seasons alluded to might derive considerable relief from change of air at those times. For since it is not the vernal increment or the autumnal decrease of daylight that attack these, but some peculiarity in the electric state of the air, so by change of air they might possibly get relief, considering that electricity varies its operation in different places. And experience teaches that the spring in one place is often unwholesome to certain invalids to whom the autumn is equally pernicious in another. The same observation applies to the solstitial seasons. There are persons with whom Devonshire disagrees in autumn, but agrees very well in spring. Bath is healthy generally speaking in winter, but is not so in summer. The same in a great degree applies to Rome: visitors of the eternal city are often martyrs to an incautious protraction of their stay through the sultry period of the late summer; those who are prudent, and even the inhabitants, in some instances, betake themselves to Florence, to Sienna, or to Naples. It is a well known fact, that persons who are subject to diarrhœa and cholera, are less subject to it when travelling, than when resting in any one place, except when they happen to get into a situation, subject to an epidemic distemper of this kind. All these circumstances, and numerous others that I could relate, naturally lead me to hope that change of air, when the peculiar effect of individual places shall become better known,

may be found useful in the cure of disorders which occur in the several seasons of the year. I have attended patients for a long time who were ill every spring ; the first budding of the hedges and the blowing of the crocus and snowdrop being regular harbingers of illness. Irritability of body, combined with weakness and irregularity of the functions in general, seemed to characterize the malady of these patients, who appeared to me peculiarly susceptible of the great electrical changes of the atmosphere which accompany the early spring. The many weathers of March are to them the source of many ills. I found by experience of such cases that medicines which tended to uphold the strength and tranquillize the irritable state of the stomach and bowels were of great use in these cases ; alterative medicines in the beginning, followed by small doses of quinine at intervals, succeeded frequently very well, in mitigating the various febrile symptoms which in different constitutions marked a general though diversified susceptibility to the influence of the vernal season.

Some persons in consequence of this peculiar susceptibility cannot easily observe the Lenten Fast : on the grosser constitutions of others this Fast is a salutary alterative ; while many from ignorance of the true cause of their complaints, have pleaded the excuse of ill health against observing it, and thus lost the benefit which they would have ultimately derived from perseverance, if they had possessed sufficient fortitude to encounter the temporary inconvenience. But this important subject of periodical Abstinence and Fasting, must be treated of more at length in another place. I have been frequently called upon to decide medically whether particular persons ought or ought not to fast ; and even in these climes have seldom been forced to forbid it, that is as far as my professional authority was available.

Persons who are ill in spring are often very well in autumn, and *vice versa* ; but this is not always the case, The custom of purging and bleeding at spring and fall, which was formerly practised, was founded no doubt on the

greater liability of persons in these seasons to disorders of which repletion was considered the cause. All the facts stated above show the action of varieties of air on the constitution, and confirm my notions of the great prevailing source of morbid excitement.

§ 8.—*Of the Disorders of Parts which have a continuity of Surface with the Alimentary Canal.*

Mr. Abernethy has spoken of diseases of surfaces continuous with the alimentary canal, as depending on disorders of the digestive organs, such for example as inflammations and local diseases of the mouth and fauces, the eyes, ears, and so on. Now though I admit to the full extent the truth of his observations and the importance of alterative medicines as remedies in cases of such disorders; yet I am not the less mindful of another important fact which I have observed myself, and which he has apparently overlooked, namely, that during certain unwholesome states of the atmosphere, numberless disorders in the membranes alluded to will occur, in many persons, as if in consequence of specific epidemical excitement; and that while the epidemic lasts, it is scarcely possible by medicine and diet to maintain that healthy action of the digestive organs on which the cure would seem to depend. Change of air will however frequently put a stop to both the local and the general disorder; which proves its greater efficacy, than any of the numberless long tried medicinal agents. I have had so many cases in point that prove this fact, that I consider it placed beyond the reach of any future doubts on the subject.

A change of wind will often put an end to a prevalent ophthalmia which for a long time resisted all attempts to cure it effectually. I have seen more trifling inflammations of the conjunctiva resist local and general depletion, and yield to an alteration in the weather. I remember one or two remarkable instances in which, after the usual alterative and antiphlogistic means had been employed in vain, severe

inflammation of the eyes subsided on the patient changing the air by travelling, during the blowing of an east wind, only about thirty miles to the north. A patient who had been long afflicted with ophthalmia applied to me on Friday for relief; on the following Monday I still found the vessels of the conjunctiva distended and the surfaces terribly inflamed. I recommended local bleeding, and ordered him calomel purges; suffice it to say that he went through the usual course of proceedings in such cases, but with little or no effect; and his business being urgent, he told me that he should persevere, ill as he was, in his excursion: he did so, and before he got to his journey's end he felt relieved, and the next day the symptoms subsided altogether. I select this as a case in point out of numerous others that I could relate.

I have known deafness, arising from an inflamed state of the ear and its appendages, subside in a similar manner by change of air. I could also relate instances of ranula, of swelled tongue, ulcers on the lips and gums, and various other forms of inflammatory action about the mouth and throat, that gave way to change of weather in some instances and to change of place in others,—after the usual alterative remedies had been long tried without success. The same might truly be said of irritation in the glottis, coughs and sore throats, and catarrhs in general, as has been related in a former chapter. Indeed I have been inclined of late to regard the sore lips, so common in parts of England in certain winters, as effects of an obscure epidemic, as they appear in numbers at once, and are in equally numerous cases cured at once by a change of weather. But of all the effects of air on the surfaces of the organs of sense, no one has so much excited my curiosity as the remarkable effect produced on the organ of hearing by changes in the barometrical pressure of the air. As the cause in this instance differs from the general influence of air and its electric changes on disorders, I shall make it the subject of a subsequent section. The discussion of it seemed

advisable in this place, inasmuch as it may lead to some plan for relieving particular kinds of deafness by means of change of situation.

Before I leave this section, however, I wish to observe with regard to alterative medicines, that they will frequently effect a speedy cure in those disorders of the membranes to which I have alluded ; and that long continued indigestion and bad dietetic habits, may justly be supposed capable of leading to the more terrible and fixed local diseases in the same parts, which in time become less within the reach either of medicinal or atmospherical remedies, as ozaena, cancer of the lips, and other established diseases.

The remarkable curative power of some vegetable infusions and diet drinks over virulent diseases of the above kind, seems referrible to their soothing influence on the stomach, where they agree, rather than to any particular change effected in the blood : they may, however, act both ways, and as I have seen some remarkable cures effected by these means, with the zemas of many plants that grow wild in our hedges and fields, I think it right to mention them, lest in considering the greater influence of atmospherical causes and of medicines of great efficacy, we should too hastily overlook or condemn those simple measures which are more within the reach of every body as available remedies in disease.

It is my intention at a future period, to treat of these popular vegetable infusions in a distinct Essay. Their history forms a curious feature in medical botany. For the principal plants whose extracts form the bases of the new French medicines possessing such a wonderful concentration of power, were the same plants, generally speaking, whose virtues, extracted in a more simple form, constituted the popular medicines of the earliest ages recorded in the pages of history. They were known to the earliest physicians of Egypt and Greece, as well as to the herbists and searchers of simples of Europe. The active benevolence of the midaeval Monks and travelling Friars extended the know-

ledge of them, and applied them more extensively to the cure of diseases; and the more advanced science of modern medical botany and pharmacy have done little else than to make new compounds of their juices, and to add a few other species to the list, taken for the most part from the same or neighbouring orders. The botanical readers who well know the genera *Salvia*, *Ruta*, *Digitalis*, *Marubium*, *Glechoma*, *Melissa*, *Veratrum*, *Convolvulus*, *Rheum*, *Cinchona*, *Scandix*, *Conium*, and many others, may amuse themselves with the recollections of numerous cases in point, while I go on in the ensuing section to the consideration of a phenomenon in acoustics to which the subject of this naturally led.

§ 9.—Of fluctuating Deafness from Atmospheric Causes.

Fluctuating affections of organs often lead us to a more intimate knowledge of the causes and cure of such as are permanent; because we can in the former case compare the fluctuations with the changes of circumstance under which they happen; and can then apply our inductive philosophy to the inference of similar causes in the latter case, from the effects with which such causes had seemed, from a regular coincidence of their respective phenomena, to be conjoined. Thus, for instance, having established it as a fact that certain disorders of a passing kind vary directly as particular atmospheric phenomena, as cause and effect, we can justly refer to the slower though less obvious operation of similar phenomena disorders of a more permanent character. It seems to me that the diseases of the ear, at present involved in so much obscurity, may receive, like other complaints, some illustration from this mode of reasoning. Deafness in general, like the suspended functions of other organs of sense, may arise from two principal proximate causes—obstruction of part or all of the accessory apparatus of hearing,—and paralysis of its necessary nervous organization. Of the first class are cases of deafness from accumulation and

hardening of cerumen, and obstructions of the Eustachian tubes, occasioned by cold and affected by inflammation : of the latter kind are cases of deafness from the occasional paralysis, or the gradual decay, of the auditory nerves. Old persons are supposed to suffer most from the latter, and young ones from the former, of these causes. But it appears to me from cases which I have attended, that deafness in old persons is more often of the inflammatory and obstructive than of the nervous and paralytic sort. Just as in the blindness of senility, I find cataract as frequent as amaurosis or even more so. Cases compounded of deafness and blindness, particularly where there is amaurosis, generally soon terminate in death. But as long and harassing cases of deafness, of inexplicable origin, often occur and baffle the curative attempts of the aurist ; so have I thought it worthy my consideration, in this place, how far and in what way atmospherical influence might be found to operate in such cases : and in stating the phenomena of the following temporary deafness, of which change of atmospherical pressure, or of something closely connected with it, appears to be the cause, I am not without a hope that it may lead in time to the further elucidation of the pathology of the ear ; many of whose more lasting disorders may be found to depend on a protracted operation of causes similar to those whose casual application produces deafness of a transitory nature.

I was first apprised of the effects produced on the ears by sudden changes of atmospherical pressure, by the following facts :—In coming down from lofty hills, into deep valleys, during journeys over mountainous countries, some years ago, I found that in very rapid descents I was suddenly affected with a deafness similar to that produced by very loud explosions ; it was accompanied with a sense of weight and obstruction, and with both sorts of tinnitus aurium : but after I had been down half an hour or more, I was entirely relieved, and could hear as well as ever. On enquiry I found many persons subject to the same annoyance, while others were quite free from it. My

curiosity being much excited, I began to prepare for speculating on the cause of this curious affection, by closely observing the laws of its occurrence in my own person. I found that hills whose height exceeded a thousand feet if their declivity made an angle of above thirty five degrees with the horizontal plane of their bases, would always afford me an opportunity of making this experiment.

I experienced this sensation for the first time on descending from Cader Idris, in Wales, in August 1814, the weather being fine : a similar effect was produced, in wet weather, in passing over the mountains by Ulswater ; and in fine hot weather in Helvellet and Skiddaw, in May 1816. The same transient deafness occurred in a great degree, but of short duration, after the descent of mount Jura, in Switzerland, July 29, 1822, just before a tempest ; and so great was the annoyance while it lasted, ~~that~~ it diminished the pleasure of viewing the stupendous mountain scenery of the Swiss and Savoyard Alps, and the lake of Geneva, bordered with villages and vineyards, which few can see for the first time without emotion. I mention these facts to show that variety of weather and of situation will not prevent the effect. I descended from mount Snowdon in August 1815, and traversed the hills of Ben Nevis in 1816, without experiencing much of it, but then the barometer was falling, and a diminishing atmospherical pressure might well be supposed able to countervail the effects of a slow descent.

I put repeated questions to people who had travelled, according to my habits of enquiry, and I found that the susceptibility of different persons to this affection varied, from those who could scarcely come down from a Devonshire hill without feeling it, to those who scarcely feel it at all. I examined aeronauts, and learnt that rapid descents in balloons afforded the most perfect examples of this disorder ; which indeed was only what might be expected ; as from the greater elevations and more rapid descent of aerial voyagers, they must, *a fortiori*, be liable to an augmented

attack of that disorder which affected the sojourners over hills ; that is, provided sudden change of elevation were really the circumstance necessary to the phenomena. Always cautious not to mistake accidental coincidences for effects, I now repeated experiments on my own person. I placed myself in different positions in carriages when descending great hills, in order to find out whether any mechanical movement of the blood towards the head, in the ordinary act of descending, could be in part the cause ; but position made no difference in the effect. And I soon afterwards found a sort of counterpart effect produced in ascending, though accompanied with some differences. Now recollecting that the density of air varied in the inverse geometrical ratio, in ascending, I readily found a solution of this question in the effect which a destruction of the equilibrium of the air within and without the tympanum might have on the action of that organ in hearing. The Eustachian tubes seemed calculated to preserve this equilibrium ; their obliteration by disease was a known cause of deafness ; and Mr. Cooper's operation of perforating the *membrana tympani* seemed, when effective, to be of use by substituting an adventitious orifice, for preserving the same balance. I recollected, too, that though a probe could be readily passed through the Eustachian tubes, yet that there were many cases of imperfect or contracted passage ; and believing cases of this sort to be common, it seemed reasonable to attribute the transitory deafness, which some persons experience, to the slowness with which the necessary equilibrium between the air within and that without the ear, which sudden descent would destroy, was restored by the tubes whose thoroughfare might be naturally difficult, and might be rendered more so by some pressure from blood, produced by the exertion of ascent. A circumstance, placing this explanation of the thing beyond the reach of doubt, soon after occurred. For during one of those well known sudden elevations of the barometer to 30. 30., I experienced, in common with some other persons, though in a less degree, the same easily recognised phe-

nomenon of slight temporary deafness. Hence it seems that changes of atmospherical pressure are concerned in the production of fluctuating obstructions to hearing; hence also we may infer the propriety of trying to produce this disturbance of equilibrium, and so force imperfect passages by change of elevation, availing ourselves of the occurrence of changes of barometer as an auxiliary, in cases where deafness seems to arise from the more trifling obstruction of the Eustachian tubes.

I may mention before I leave this subject, that I have known several persons who have experienced a very considerable relief from long continued deafness on changing the air by going to a distant place; I have also known several in whom a mild alterative course of medicine, undertaken for the cure of some other complaint, has cured habitual deafness. Mr. Abernethy has related other instances of this fact; and, I think, he has rightly ascribed it to the improved state of the digestive organs, with which all parts about the head are apt to sympathize.

§ 10.—*Of Toothache: its periodical Attacks; occasional Obedience to Change of Air and to the Bark.*

I am convinced that teeth are more vascular than is usually imagined, and the phenomena of their diseases seem to confirm my opinion. Possibly the substances used for curing the toothache, and particularly Mr. Clarke, jun.'s excellent method of stopping them with a composition which in most cases immediately allays the pain, may act on the living organs of the tooth, as well as on the carious and dead matter, and by deadening the former and acting chemically on the latter, may thus cause the pain to cease, as it were, in a two fold manner. It is due to that gentleman to observe, however, that his method is attended with very great success, particularly in cases of toothache, which depend on the exposure of the nervous parts of the tooth by the process of mortification called rotting, which is the

commonest kind. Besides this sort of toothache, there are two or three other kinds. One depends on inflammation of the periosteum of the fang ; another of the socket ; another of the gum. There is also a nervous toothache, which partakes of the character of rheumatism, and which often becomes periodical. In this latter case I have employed the bark with success : the pain often extends to the jaw and to the temples, at other times it seems to affect all the branches of the nerve, partaking of *tic douloureux*, in which disease it sometimes ends, after the extraction of the tooth. This sort certainly appears to require constitutional treatment. But as toothache, which begins by simple inflammation of the exposed nerve, often ends in the periodical kind, I have proposed to patients, in order to avert the disastrous consequences of such termination, to apply early to a dentist to stop the carious cavity, and at the same time to permit me to regulate their stomach and bowels by medicine, that we might combine constitutional and local treatment together ; for constitutional disturbance will interrupt the salutary chemical process, by giving rise to affections of the nerve out of the reach of the local remedy. Even in bad compound cases, the success of the process above alluded to, seems to me to have sometimes been so successful, that I should feel warranted by facts in referring patients with carious teeth to a mode of operation which, even where it fails to cure those which are the most diseased, seems calculated to save the greater number from further mischief.

That the toothache, when it assumes the intermittent character, will often yield to the bark, I am convinced by experience. The method I have employed on this as on other occasions is to open the bowels gently with calomel, which has also a tendency to rectify the biliary secretion, and then to administer the bark, in a large dose, before the expected recurrence of the paroxysm. The sulphate of quinine, now in more general use, may with much additional comfort to the patient be substituted for the ordinary mode of giving the bark. The first thing often observed on taking

the above medicines, is the change of a periodical toothache, into one which is continued, but less agonizing, and which subsides by degrees. Where the paroxysm seems more of a rheumatic kind, and gets worse when the patient is warm, a further depletion with the calomel will be desirable. In all cases, change of air might be tried if convenient. I have known it produce the most surprising effects, in cases of toothache which have been but imperfectly cured by doses of bark.

A case occurred lately of a lady who always had toothache when residing at a particular town on the coast of the Mediterranean, but who lost it on going into the interior of the country. All those who desire to preserve good teeth, should pick them and brush them daily, as the remains of the food, lodging in their interstices and cavities, is the principal exciting cause of their premature decay.

§ 11.—*Of Epidemical Gumboil and Sore Mouth.*

Gumboils frequently arise from bad teeth and neglected gums; but there are boils and small ulcers of the gums, lips, and mouth, which arise from some epidemical influence, and subside on change of weather, or on change of situation. I remember too a terrible epidemic disease of this kind, during which I had several patients afflicted with it, whose complaint began with a species of small ranula ending in offensive ulcerations and pyalism. In this case I employed some of the strong vegetable infusions with apparent success. At length the disease yielded to a change of weather, when a large number of patients, at one time, had the pleasure of offering to each other mutual congratulations of recovery.

§ 12.—*Of the Varieties of Headache and their connection with Atmospheric Electricity.*

It will be proper in this place to consider the different sorts of headache, and their relation to electric changes of atmosphere. Headaches are not usually disorders of long

continuance at a time, at least, the sort of which I propose to treat ; and consequently they cannot afford us much example of the good effects of change of residence ; they, however, exemplify in an eminent degree the sudden operation of atmospherical causes on the brain and nervous system. By often recurring at lunar periods, and at casual changes of weather, they prove their obedience to the stimulus of certain aerial vicissitudes.

That fatigue, cold, nightwatching, bile, repletion, and other causes of debility and irritation will produce the slighter forms of this disorder, in almost every body, is a fact of daily occurrence ; but the more violent and definable headaches which are the subject of this enquiry, are easily referrible to atmospherical causes ; and contribute in no small degree to strengthen the opinions that I have formed of the particular agency of electricity in nervous diseases.

The worst form of headache is perhaps the one which more immediately illustrates the rapid effect produced by irritation of the stomach, on the brain, in consequence of indigestion : it occurs chiefly in young persons ; for by degrees, its attacks becoming less and less frequent, it wears out. The usual symptoms of this form of headache are as follows :—Soon after breakfast, or some other meal which is not digested from some disagreement with the stomach, the patient finds his vision suddenly obscured, objects are in part unseen, and there seems a wavy motion in every thing : sometimes one eye is affected before the other ; but whether this be the case or not, by shutting one of the eyes, the patient can generally see more distinctly with the other alone, than he can with both open together. This partial blindness lasts less than an hour, and is succeeded by a headache in the frontal parts, accompanied by rigor, nausea, and disturbed functions of the digestive organs, after which the whole goes off. Persons have mitigated the attack by medicines, but they cannot always keep it away. It has been justly attributed to indigestion ; but though it may begin with undigested food, yet something peculiar must

have previously disqualified the stomach for digesting ; and the disease is sometimes periodical.

Now although there must be particular predisponent causes for so extraordinary a malady as the one described, yet it is evident from the sudden occurrence of the attack after eating, that irritation in the stomach, produced by the food, and acting on the head by sympathy, is the cause of the disorder, a circumstance which is further confirmed by the fact that an emetic or a brisk cathartic will carry it off sooner than it would disappear if let alone. The tongue is generally furred, and there is a bitter taste in the mouth, during these headaches.

As the mental powers remain unimpaired during headache, it seems rational to conclude that the great pain felt in the forehead is seated in the meninges of the brain, and not in the organs themselves where it would produce the delirious symptoms of phrenitis. Yet in the above case of headache, preceded as it is by an affection of vision, the irritation must first begin either in the optic apparatus, or in some part of the brain contiguous to it, and must be afterwards transferred to the front part of the membranes of the brain : otherwise the particular train of consequent symptoms would remain unaccounted for.

Another sort of headache takes place at a longer interval of time after an indigested meal, and may therefore, with propriety, I think, be ascribed to irritation occurring in the duodenum and small intestines. After an indigested dinner, or a meal later in the day, taken in unusual quantity, and particularly after excess in wine and fermented liquors, the patient rises next morning with a headache, occupying the frontal region which is exasperated by the slightest motion : it generally gets worse and worse till towards the afternoon, and then begins to go off, and by seven or eight in the evening is often gone. When, however, it persists through the evening, a few grains of rhubarb of calomel and the extract of aloes combined, taken in form of a pill, at bed time, will generally remove all symptoms of this kind of headache before morning.

This sort, like all other headaches, occurs with greater or less degree of violence, according to circumstances. Persons are more disposed to it in situations where the air does not agree with them, than in other places where a wholesome atmosphere ensures a good digestion. Both the above disorders have been designated by the undistinguishing name of sick headaches, because in both indigested food being the cause of the complaint, a degree of sickness occurs in the course of its natural or artificial cure.

I was formerly inclined to attribute the affection of vision above described, to the distension of the plexus choroides, which being violently injected with blood might press on the thalamus of the optic nerve; and several distinguished physiologists seemed inclined to the same opinion: but in the year 1815 I demonstrated to the satisfaction of anatomists that the parts called *thalami nervorum opticorum* had in reality nothing to do with the origin of the optic nerve at all, but were ganglia of increment for the addition of the fibres of the posterior lobes of the cerebrum, which take their origin from the *tuberculum olivare*, passing through the *Pons Varolii*: consequently this explanation falls to the ground and the proximate cause, if our knowledge of it be of any practical utility, must be sought for in a sympathy of the optic nerves itself with the irritation which is going forward in the brain.

Another species of headache remains to be described, which may be called nervous, and to which some persons are terribly subject. The patient feels over night more or less of a dullness of thought, and an inaptitude for the slightest exertion, and sometimes a sense of thirst; on waking in the morning, he yawns, feels indisposed all over, and complains of pain in the forehead, greatly aggravated by motion. The tongue is found to be furred, and the appetite is faulty. The symptoms get worse towards the middle of the day, and usually begin to subside before six in the evening, and are often gone by seven, going off with rigor and slight fever. The pulse, however, remains little disturbed, or is perhaps

only accelerated when the patient moves. This electric sort of headache is not to be evaded by any means at present known, nor during the limited period of its continuance can it be much alleviated by medical aid : The strongest purges given over night, when it is expected, have no sensible effect on it, and I have known cases where the customary operation of a cathartic, taken by the patient, was postponed, as it were, by the constitution, till after the headache had run its course : in other cases the operation of the medicine did not much assuage its dreaded violence. I have tried pressing the temporal arteries without success. Patience, rest in bed if possible, and the abstraction of noise are found to constitute the only available practice in this malady. This disease occurs often periodically once or twice in a month, that its visits oftener happen near the periods of the new or full moon, and that the first occurrence of east wind, in persons subject to it, seldom fails to bring it on in its more violent forms. If east wind suddenly occur about the new or full moon, or at the patient's accustomed periods of irritability, and if indigestion, from excess, is greater at those times, a still more fearful visitation of this appalling pain may be apprehended, from the conjoint influence of several causes occurring together. That electricity is somehow or other the cause of this, as it is the exasperator of other headaches, is beyond a doubt, though the particular manner of its action is yet unknown. That the disease begins on the evening preceding the pain is evident from the precurrent sensations that I have described. Exposure to damp night air in unwholesome countries, cold feet, and mental anxiety after dinner, the day before, concur to aggravate the symptoms.

Slighter degrees of this sort of nervous headache occur before and after thunder storms, as I have elsewhere noticed, and they are relieved by the actual fall of rain. All these, as well as many other circumstances in the electric history of east winds, show the connection of headaches in particular, with that general disturbance of health, which electricity is capable of producing. But why its effects are different on

different persons, why similar disorders induced in the organs of digestion by the very same cause, should at different times, and on different constitutions, produce such dissimilar effects, will probably long remain unknown. We refer them, and I think with propriety, in the absence of a more accurate knowledge of the subject, to the endless varieties of constitution on which atmospherical causes, equally obscure and innumerable, are perpetually acting.

Other sorts of headaches occur which it will be hardly necessary to particularize. Indigestion will produce hemieramia or an affection of only one side of the head. There are also numberless headaches symptomatic of fevers, and of other local diseases. Every variety, in the present imperfect state of our knowledge, ought to be noticed, but all taken collectively have not as yet been able to do much towards a tolerably decent knowledge of the pathology of the head. There are some warm climates in which headaches are unknown: they are more common among women than among men, and among the rich and luxurious than among the poor and abstemious. Like some other bad pains they are happily lessened in frequency and violence towards the decline of life, and are best guarded against by good air, exercise, and those habits of temperance and regularity which give permanent strength to the constitution.

From a conviction that electricity has much to do with the cause of headaches, I have set about various experiments in order to try if the defect or irregularity of electricity might be supplied by means of artificial conductors, so contrived as to let into the house a collected portion of the fluid; or by means of the electric machine and insulating stool. I recommend the repetition of these and such like experiments to those who have time, and are willing to cooperate with me in such curious trials; but I would admonish the practitioner, at the same time, to avoid giving the patient much hopes of relief, at the onset, lest in experiments which require so much nicety and skill, an accidental failure in the result of the practice should fling a premature slur on the attempt.

§ 13.—*Of more determined inflammatory Diseases of the Brain and Chest.*

I have obtained the most satisfactory information of the influence of air in phrenitis ; strange as it may seem to those who view this disease as the result of its ordinary causes alone, cases have occurred in which young persons, with a tendency to brain fever, have brought it on, by change of residence, particularly by going into a low damp situation ; and they have never been completely freed from the returns of symptoms, till they have regained a dry healthy air, to which they may have been accustomed : of this fact I have now one remarkable instance before me. Generally speaking, these acute disorders, when occurring in the brain, often go on too rapidly to delirium and death to admit of any observations being made on the benefit of change of air. Antiphlogistic remedies of an active nature must be instantly resorted to ; and in our perception of their sudden power over the paroxysms, we lose sight of the primary atmospherical cause of the disease. The same observation will apply to peripneumony and pleurisy, which, though sometimes casual occurrences, arising from apparently accidental causes, are frequently of atmospherical origin ; of which the epidemic pleurisy of 1667, so well described by Sydenham, is a case in point. The same author has described prevailing coughs and inflammations of the chest evidently originating in similar causes.

We have on record many cases of epidemical hemoptysis and hematameis, and I have also observed in animals similar epidemics. But, to return to diseases of the head, there are cases on record of the most diversified though best characterized disorders of that class, which from their history, local range, and termination, could only be referred to the weather as the exciting cause, however luxuries and the abuses of the appetite might have prepared the sufferer for their attacks.

Apoplexy supervenes on a life of intemperance, and its fits are often brought on by mental emotions, but certain

sorts of sultry weather are more favourable, than cold, to its visitations. Fits of this disease are more common near to the periods of lunar opposition and conjunction than at other times; and they frequently happen during the close weather and electric excitement that precedes thunder storms.

I have neither time nor inclination to swell this enquiry into a large book, or I could fill volumes with cases and facts that I have collected, in order to prove the influence of the electrical atmosphere on the most defined inflammatory disorders of the brain. And, what is remarkable, this class of disorders seems more under the direct influence of the moon's periods than others, which, no doubt, has given rise to the word lunacy: The more violent symptoms of madness are known to have often coincided with the period of full moon. I have added, to this common observation, another fact, that similar effects take place at new moon, and are also found to prevail at other times, when great changes of weather are effected by a disturbance of the atmospherical electricity. But it is time to pass over to a train of nervous, but less obviously inflammatory, complaints to which this subject naturally leads.

§ 14.—*Of Nervous Complaints, and their connection with Atmospherical Causes.*

The whole of that evervarying train of ills, commonly known by the name of nervous disorders, are more under the influence of the air than is commonly thought.

It has been justly observed, that during the progressive malignity of pestilence, various symptoms occur of disorders whose characteristic is the rupture of the surface of the body, as spotted fevers, the bubo of the plague, ulcers, and so on. But I have observed that there are other epidemics which never break the surface, at whose crisis of violence the more terrible forms of cerebral disorders happen; while the whimsical symptoms of less violent nervous complaints follow in their train. These, from their close connection with dis-

ordered stomach and bowels, and their often yielding to alterative medicines, are too generally attributed to the sympathy between cerebral and digestive disorders ; while both in fact result from atmospherical excitants, though they exist afterwards as symptoms capable, if not corrected, of producing mutual aggravation.

This is precisely the point of view in which I wish to make the followers of Mr. Abernethy regard many nervous as well as local disorders. For to me it appears that, mistaking the great relief afforded by simple medicines acting on the digestive organs, for a cure of the disorder, they have sought for the origin of the latter in what was only one of its most leading and influential symptoms.

Since the publication of Mr. Abernethy's works, and the consequent improvement of medical practice, several persons have positively asserted that nervous diseases never occur while the digestive organs can be kept in order. This may be generally true ; but it is true also, that during the prevalence of epidemics, and at periods of irritability, it is often impossible, by medicines, to regulate the stomach and bowels. Hence, at these times, we fail in one of the essential means of cure.

Hysteria, epilepsy, melancholy, spectral illusions of various kinds, and all those disorders called nervous, observe the same course as I have described, having crises near the lunar periods, and being frequently products of the epidemic constitution of the air. That whimsical disease chorea once prevailed so generally in France as an epidemic, that all medicines were deemed unavailing, and the recourse had to the prayers to St. Vitus, about whose feast in July it occurred, gave rise to the name St. Vitus's Dance. I have heard a similar origin given to St. Anthony's Fire, at a time when erysipelas prevailed as an epidemic in January.

§ 15.—*Of Spectral Illusions and other deceptive Images.*

As the reciprocal operation of disorders of the brain, and those of the digestive organs on each other, by what is

called remote sympathy, is a well established fact in physiology, I shall not dwell on it here, nor adduce any fresh proofs of its almost universal operation in disease, but shall proceed to describe an example of one of the most remarkable effects of this sympathy, in what are called Spectral Illusions, a form of hallucination, in which the imagery of an exceedingly irritable brain is so vivid as to induce the patient to mistake the spectral impressions for real objects. That the proximate cause of these illusive spectra is a peculiar irritability of the retina and optic nerves, and of those organs of the brain which cooperate with them, in the production of objects of sight, is beyond doubt; while we can often trace the exciting cause to change of weather, producing irritation in some portion of the alimentary canal, and thus acting conjointly with moral causes that seem to determine the particular nature of the phantoms presented to the mind of the patient. In order, however, to explain more fully the nature of so extraordinary and fearful a phenomenon, it will be necessary to go a little further into the physiology of sensation in general, and then to apply our principles to vision in particular, both in its healthy and in its morbid state.

The subject is in itself so deeply metaphysical, and yet at the same time so necessary to be understood, in order to illustrate many physical truths, that I shall require no apology for engaging the reader to go with me into a wider field of investigation. The misfortune of these enquiries into the mind is that, in addition to the difficulty that naturally attaches to them, they have been rendered still more difficult by the prejudice which bad logicians and wordmongers have impressed on the minds of young enquirers. The false basis on which Berkley built his reasoning, and the absurd conclusions he came to; the studied sophistry of Hume; and the verbiage of Dugald Stuart, have all had a natural tendency to prejudice men of common sense against a science which being something *beyond* the ordinary reach of natural philosophy, or a knowledge of the phenomena of *Physics*, was

called *Metaphysics* ; a science, however, which if studied by able persons acquainted with logic, enables them to attain to the most comprehensive power of general reasoning, capable of being applied to any subject of human knowledge. The *Essay on the Relations of Cause and Effect*, by Lady Mary Shepherd, and also her *Essays on the Perception of an External Universe*, which have lately issued from the press in London, contain the finest and most comprehensive code of metaphysical philosophy to which I can refer the reader, who wishes to go deeply into the general subject of perception ; and with this reference I shall content myself in this place, while I proceed to the consideration of some of those more particular effects of disordered sensation, which I alluded to in the foregoing part of the section.

Previous to going into the proposed enquiry, however, I will submit a question to the consideration of metaphysical opticians, though similar questions may be made to relate to objects of other senses.

If a man see a particular object, as for instance a golden sphere, of a foot in diameter ; if he afterwards fall asleep and dream that he see a similar golden sphere of the same diameter ; and if he again awake and then only think of the golden sphere which he had seen and dreamt of ; in what relation do the aforesaid *golden sphere seen*, the *golden sphere dreamt of*, and the *golden sphere thought of*, stand with respect to each other ; since all the three were ideas of an object of the same size, colour, and figure ? I think it may be replied, that in the first instance the image had an external continuous and independent cause, and was viewed with a full belief of its permanent reality, capable of being proved : in the second instance, the same object was viewed accompanied only with a temporary belief of its reality, which waking destroyed ; while in the last case, it was viewed only as an image of thought, having no existence external to the body. This leads however to grand questions discussed in the above works, namely—since it is possible to view images in thought, and in dreams to believe

them to be real, what is the criterion whereby, in cases of the perception of objects themselves, we are enabled to determine their external existence? The truth of the matter is, that in *all* the above three cases which I have described, the perception of the apparent object or *image* is in the sensorium; in the first instance this sensorial image was caused by the impression of a real object which had one external independent and continuous cause. In the second, or the dream, the sensorial image was reproduced, in the absence of the external cause that first excited it, by some internal activity of the brain, induced perhaps by a train of associated motions, and was believed in, for the time: while in the third case, the sensorial image was contemplated, when we were awake, and felt the full pressure of surrounding objects, and it was not believed to exist externally, its *fainter* image being capable of being compared with the more vivid impressions of exterior beings. These subjects are calculated to excite the most intense curiosity. The disorder in question, called Spectral Illusion, consists in such vivid imagery, that the patient is in a sort of waking dream. Mental images, indeed, admit of an illustrative classification, which I shall take from a work of mine published some years ago. Imagination may be thus arranged.*

1. *Images of Perception*, as when I look at an externally existing body actually present.

2. *Images of Thought* or mental images, which are the subjects of our thoughts, and seem to be faint and waning resemblances of their real external types.† It may here be

* Numerous cases are related in the "*Perennial Calendar*," 8vo. London, 1823, sold by Messrs. Hookham, Bond Street, and Mr. Guy, Chelmsford.

† The word *real* comes from *reor*, and signifies therefore any object of thought, to think is to be *thinged*: *vercor* or *valdereor* is to be very much thinged: an object is real if it be viewed at all, but an independent and continuous existence without the body, is that to which we usually apply this term. And that objects do so exist, independently of our perception of them, is just the very thing which it has been the labour of metaphysicians to prove in all ages. It is satisfactorily done, at least to my mind, in Lady Mary Shepherd's *Essays on the Perception of an External Universe*, chap. ii, sect. 2nd, to which I refer the reader who wishes to pursue this very intricate but profoundly instructive enquiry.

noted that when we perceive a real object, it is by means of our senses, and the various organs of the brain appended thereunto; so that what we call the perception of objects is, in fact, the perception or consciousness of certain configurations of our organs, which external objects produce in such a manner as that these configurations shall vary according to the varieties of the objects which excite them, so as to convey to us an exact knowledge of those objects; the nervous bodily organs being, as it were, the medium between the Mind itself and the external world. And further, our Organs are kept in a fit state to become such a medium by the Principle of Life. Now it seems that the Images of Thought are fainter repetitions of the said configurations of our organs; and they serve to constitute our stock of knowledge; inasmuch as they enable us to store up and recollect the images of absent objects. Imagination, with respect to the Images of Thought, is the power of forming new combinations out of the recollected materials of our perceptions; thus, we can think of a horse with a fox's tail, but we must have perceived beforehand both of these objects separately, before we could so combine them in fancy. Images of Thought then illustrate the proposition of the philosopher Kant, that we know Objects only in relation to the Subject. We can imagine, in thought, not only the figure of a person, but their voice, smell, and touch, because the actions of all the cooperative parts of the brain which produce images, are repeated, and, as it were, called up voluntarily by the mind in the act of thinking.

3. *Images of Sleep* or Dreams are in fact the aforesaid Images of Thought, and only differ in this, that the impression of external objects being withdrawn, and our whole attention being fixed on the Images of Thought, these take place with a degree of strength and vividity almost peculiar to sleep; and the Mind, having no exterior impressions to compare with them, believes them to be external objects. Great varieties of scenery also are produced in dreams by the power of imagination, that is, by the power every Organ of

the Brain possesses of acting spontaneously. Different organs in various degrees of imperfect sleep and of vigilance act together, and the combinations of images are infinite. There is a portion of the brain called the Organ of Ideality, from its power to excite and give a poetical colouring to our ideas or Images of Thought ; and persons with this organ, which lies in the lateral and upper part of the head, have the most splendid and romantic thoughts and dreams. When the portion of the brain immediately behind this organ is larger than ordinary, it disposes persons to be superstitious ; and it is called the Organ of Supernaturality. It gives the same character to the dreams, as to the thoughts of its possessor. Our dreams too, just like our thoughts, are influenced by the character of our minds as respects hope, fear, philosophical acumen, and so on.

4. *Images of Spectral Illusion* or Spectral Impressions seem to be the Images of Thought occurring while we are yet awake, but with all the vividness and apparent reality with which the Images of Sleep are usually accompanied ; so as often to deceive the patient into a belief that he sees real objects : hence ghosts, phantoms, and a thousand imaginary creatures of terror.

These spectral images vary in kind ; and their varieties, however apparently infinite, may be divided into several kinds. The common Ocular Spectra seem to take place in the retina, and are of various sorts ; they are accurately described by Dr. Darwin in *Zoonomia*. But the Spectral Impressions of the most fearful nature are those which appear to take place by the morbid and spontaneous activity of more deepseated parts of the brain, those perhaps which phrenologists call the Organs of Form, of Colour, and often in those of Sound. They are exemplified in the Spectres or false appearances of absent persons, hideous and fanciful figures, and other phantasms of a disordered brain. What is called the Blue Devils belongs to this class. This last sort of Spectral Illusion generally owes its existence to a morbid state of the nervous system, and of

the circulation of blood in the brain which accompanies it; other organs, as those of Fear, Hope, Supernaturality, and Ideality, partake usually of the cerebral irritation; and hence it is that Spectral Illusions are often accompanied with a deep and gloomy melancholy—a frightful despondency—a mysterious awe of something supernatural—too intense and too peculiar to be described in words, and of which experience can alone furnish the reader with any idea, if we credit those who have been the subjects of its attacks. This state of brain is a real disease; and though it comes and goes, and appears to happen to persons without affecting their health, it is, like other diseases of the head, often roused into action by some change of weather, and frequently by disorder of the digestive organs; and it should be treated medicinally by purgatives, bleeding, exercise, and diversion of mind.

The above disease is distinct from, though closely allied to, those morbid and fixed errors of thought which take place in Hypochondriasis and Insanity, the discussion of which would open too wide a field of investigation; and we should be induced, if we entered therein, to range beyond the prescribed limits of our work.

We trust we have sufficiently accounted for spectra to relieve people from the terrors to which their appearance has often subjected them. We have known persons who have been deceived by them, and have related their intercourse with Spirits, and with the Manes of the dead. We have known others, of philosophical minds, who have been able to recognise them as phantoms of the brain, and have compared them with the external objects in the room through which they appeared to pass, but who nevertheless could not get rid of them, without medical means.

There is one fearful consideration with regard to this disease, that though a particular organization of the brain be most conducive to it under its most moody and mysterious form, yet all persons may, by disorder of the cerebral parts, become more or less the subjects of it. And as from the

common law of coincidences, there will often appear to be imposing events connected with these spectres, the unwary may be led thereby into a belief of their real existence as prophetic agents, and may become superstitious in despite of philosophy. If this account of the disease should contribute to prepare any persons against such credulity, it will have rendered them an essential service, in explaining the physical cause of their apprehensions, and pointing out the remedy.

A common sort of Spectra are those seen so often in childhood, which appear like various and everchanging spots, speckles, lozenges, squares, and patterns, floating as it were before us, as we lie in bed at night, and which aided by a little imagination, seem to be undergoing a perpetual variation in their shapes and colours.

But when Spectral Illusions occur as a disease they have a fearful and imposing character. In violent fevers the patient, confined to his bed, is incapable of acting on any of the false impressions of his disordered brain; but where, from atmospherical excitement, combined with predisponent moral and digestive causes, this disorder is as it were idiopathic, and unaccompanied by manifest fever or illness, its consequences are sometimes truly distressing. The hideous faces by which nervous persons are haunted at night, as mentioned by Locke, are spectra of the kind alluded to, but of a fainter sort.

These ghastly visages, as well as other troops of spectral beings, often pass in gorgeous pomp before the eyes of the nervous literary men by night. And it is in this middle state between sleep and vigilance that a corresponding sort of intermediate Spectral Images occur which constitute the airy day dreams of the poet, and which vary according to the natural bias of his mind. Thus the painter sees the finest landscapes, and, in thought, revels in scenes coloured with the rich tints of Claude Lorraine, or marked by the wild pencil of Salvátor Rosa. The musician hears new melodies harmonized, or rendered discordant, according to

the temper in which he went to sleep ; the engineer dreams of mechanisms, or of flying ; the sculptor sees statues of unwonted beauty ; the florist flowers of exquisite hue ; while the classical historian fights the battles of Homer and of Lucan, follows the army of Hannibal over the Alps, or startles at the allellagmas of the legion of Cæsar ; or, in a more moody and religious temper of mind, scans the renowned hill of Oreb, and in fancy hears the mysterious accents of the prophet, which have had such a memorable influence on the succeeding ages of the world. Thus we see how it happens that materials are perpetually laid up by education in the storehouse of knowledge, which memory can bring forth under the proper guidance of the Will, in health, for useful purposes ; but which, if mixed and worked up in the laboratory of the imagination by the chemistry of fancy, are capable of being changed into the most whimsical and imposing combinations of form. For, as in other parts of the body, so in the cerebral organs, the various predisponent causes already in league, are roused into action by an atmospherical or other excitant operating through the medium of indigestion.

Probably many of the ghosts of country peasants, and the phantoms of the fairy mythology, the nocturnal lemures of the Romans, and the second sight of the Scotch Highlanders, with other forms of superstition, have had an origin in the illusive phantasms of this disease. Dr. Ferriar* has written a curious work on them, to which I refer the reader, as well as to a still more numerous collection by Dr. Hibbert.† It is probable, too, that many of the strange stories of Glanville, in his book on Witchcraft, as well as the many relations of haunted houses and nocturnal spectres, which arose out of the confusion of religious ideas, attending what is called the Reformation, may be attributed to similar causes. The unhappy reign of Charles the First afforded numerous examples of the causes of these spectra. The frequent

* Ferriar on Apparitions.

† Hibbert on Spectral Impressions.

agitations of the public mind; the loss of the salutary discipline by which the church had formerly kept hope and credulity fixed on their proper objects; the diseases engendered by luxury; and a peculiarly unhealthy constitution of the air, all combined their influence to produce the errors of imagination in question. No period of history ever abounded with more disgusting sallies of superstition of this kind, than the age alluded to.

Some unfortunate coincidence of spectra with events which they seemed to forbode, have occurred in all ages, and have strengthened the empire of superstition.

Cases have come before me of persons who suddenly saw before them the figures of absent friends, and of other objects, in so vivid a manner that they fancied them at first to have a real existence. I have prescribed aperient medicines, bloodletting, and exercise with considerable effect; but what is remarkable is that these images have a tendency to return periodically: and in one instance they occurred to a patient from omitting his customary bleeding in spring.

Epidemia has occurred in the form of fever, whose distinguishing characteristic has been that of spectral illusions of the kind alluded to: and in some instances the plague, and other pestilential fevers, have been preceded by the delusive appearances of ocular spectra, and of the most vivid and beautiful colours, with which objects seemed tinged.

I was consulted once by a very learned gentleman who said he was terribly haunted at night with the appearance of strange figures dancing about his bed room: he viewed his disorder very coolly, and compared the vividness of the spectra with that of furniture in the room; suffice it to say, that the disease yielded to alterative medicines and a better state of his general health.

I shall close this section with introducing the extraordinary case of the celebrated Berlin bookseller Nicolai to the reader's notice: it furnishes a remarkable instance of this disorder occurring in a philosophical mind capable of

coolly observing its phenomena from the beginning to the end of the disease. I shall describe the phantoms of Nicolai in his own words as they are recorded by Dr. Ferriar, being the most precise and simple narration of facts of this kind that I know of. I will observe, however, previously, that there are three concurrent causes for this disorder,—the particular organization or frame of mind, which was the adjunct cause of the peculiarity of the phantasmal symptoms; the state of the constitution, owing to the omission of a customary bleeding; and mental agitation; which constituted the predisponent causes; while the occurrence of the disorder at a time of year particularly obnoxious to nervous irritation would seem to point out a source of excitement in the state of the atmosphere. The case as related by himself is as follows :—

I saw, in a state of mind completely sound, and after the first terror was over, with perfect calmness, for two months, almost constantly and involuntarily, a vast number of human and other forms, and even heard their voices, though all this was merely the consequence of a diseased state of the nerves and an irregular circulation of the blood.

It being a matter of importance that an incident of this nature should be observed with the strictest attention, and related, together with all collateral circumstances, with the most conscientious fidelity, I shall not omit anything of which I retain a recollection. The truth of what I am going to advance will not require a farther testimony, as Dr. Selle, who was my physician and was daily informed by me of every trifling occurrence and change that happened, is still living, and will, by all who know him, be most readily admitted as an unobjectionable witness. During the ten latter months of the year 1790, I had experienced several melancholy incidents which deeply affected me, particularly in September, from which time I suffered an almost uninterrupted series of misfortunes. I was accustomed to be bled twice a year, and this had been done once on the 9th of July, but was omitted to be repeated at the end of the year 1790. I had in 1783, been suddenly taken with a violent vertigo, which my physicians imputed to obstructions in the finer vessels of the abdomen, brought on by a sedentary life and a continual exertion of the mind. This indisposition was successfully removed by means of a more regular and strict diet.

I had, in January and February of the year 1791, the additional misfortune to experience several extremely unpleasant circumstances, which were followed on the 24th of February by a most violent altercation. My wife and another person came into my apartment in the morning in order to console me, but I was too much agitated by a series of incidents which had most powerfully affected my moral feeling, to be capable of attending to them; on a sudden I perceived, at about the distance of ten steps, a form like that of a deceased person, I pointed at it, asking my wife if she did not see

it? It was but natural that she should not see any thing, my question therefore alarmed her very much, and she sent immediately for a physician; this phantasm continued about eight minutes. I grew at length more calm, and being exhausted, fell into a restless sleep which lasted about half an hour; the physician ascribed the apparition to a violent mental emotion, and hoped that there would be no return, but the violent agitation of my mind had in some way disordered my nerves, and produced farther consequences which deserve a more minutedescription.

At four in the afternoon, the form, which I had seen in the morning, reappeared. I was by myself when this happened, and being uneasy at the incident, went to my wife's apartment, but there likewise I was prevented by the apparition, which, however, at intervals disappeared, and always presented itself in a standing posture: about six o'clock there appeared also several walking figures, which had no connection with the first.

I cannot assign any other cause of all this than a continued rumination on the vexations I had suffered, which, though calmer, I could not forget, and the consequences of which I meditated to counteract; these thoughts occupied my mind three hours after dinner, just when my digestion commenced. I consoled myself at last with respect to the disagreeable incident which had occasioned the first apparition, but the phantasms continued to encrease and change in the most singular manner, though I had taken the proper medicine and found myself perfectly well. As when the first terror was over, I beheld the phantasms with great emotion taking them for what they really were, remarkable consequences of an indisposition, I endeavoured to collect myself as much as possible, that I might preserve a clear consciousness of the changes which should take place within myself; I observed these phantasms very closely, and frequently reflected on my antecedent thoughts to discover, if possible, by means of what association of ideas exactly these forms presented themselves to my imagination; I thought at times that I had found a clue, but taking the whole together I could not make out any natural connection between the occupations of my mind, my habits, my regular thoughts, and the multifarious forms which now appeared to me, and now again disappeared. After repeated and close observations, and calm examination, I was unable to form any conclusion relative to the origin and continuation of the different phantasms which presented themselves to me. All that I could infer was, that while my nervous system was in such an irregular state, such phantasms would appear to me as if I actually saw and heard them; that these illusions were not modified by any known laws of reason, imagination, or the common association of ideas, and that probably other people who may have had similar apparitions, were exactly in the same predicament. The origin of the individual forms which appeared to me, was undoubtedly founded on the particular nature of my mind, but the manner in which it was thus affected, would probably remain for ever as inscrutable as the origin of thought and reflection. After the first day the form of the deceased person no more appeared, but in its place, there appeared many other phantasms, sometimes representing acquaintances, but mostly strangers, those whom I knew were composed of living and deceased persons, but the number of the latter was comparatively small. I observed the persons with whom I daily conversed did not appear as phantasms, these representing chiefly persons who lived at some distance from me. I attempted to produce at pleasure phantasms of persons whom I knew by intensely reflecting on their countenance, shape, &c. but distinctly as I called to my lively imagination the respective shades of

three of these persons, I still laboured in vain to make them appear to me as phantasms, though I had before involuntarily seen them in that manner, and perceived them some time after, when I least thought of them. The phantoms appeared to me contrary to my inclination, as if they were presented to me from without, like the phenomena of nature, though they existed no where but within my mind. I could at the same time distinguish between phantasms and real objects, and the calmness with which I examined them, enabled me to avoid the commission of the smallest mistake. I knew exactly when it only appeared to me that the door was opening and a phantasm entering the room, and when it actually opened, and a real person entered.

These phantasms appeared equally clear and distinct at all times and under all circumstances, both when I was by myself and when I was in company, and as well in the day as at night, and in my own house as well as abroad; they were, however, less frequent when I was in the house of a friend, and rarely appeared to me in the street; when I shut my eyes these phantasms would sometimes disappear entirely, though there were instances when I beheld them with my eyes closed, yet when they disappeared on such occasions, they generally reappeared when I opened my eyes. I conversed sometimes with my physician and my wife of the phantasms which at the moment surrounded me; they appeared more frequently walking than at rest, nor were they constantly present. They frequently did not appear for some time, but always reappeared for a longer or a shorter period either singly or in company, the latter however being most frequently the case. I generally saw human forms of both sexes, but they usually appeared not to take the smallest notice of each other, moving as in a market place, where all are eager to press through the crowd; at times however they seemed to be transacting business with each other: I also saw several times people on horseback, dogs and birds. All these phantoms appeared to me in their natural size and as distinct as if alive, exhibiting different shades of carnation in the uncovered parts as well as in different colours and fashions in their dresses, though the colours seemed somewhat paler than in real nature; none of the figures appeared particularly terrible, comical, or disgusting, most of them being of an indifferent shape, and some having a pleasing appearance.

The longer these phantoms continued to appear the more frequently did they return, while at the same time they increased in number, about four weeks after they had first appeared. I also began to hear them talk; the phantoms sometimes conversed among themselves, but more frequently addressed their discourse to me; their speeches were commonly short and never of an unpleasant turn. At different times there appeared to me friends of both sexes, whose addresses tended to appease my grief, which had not yet wholly subsided: these consolatory speeches were in general addressed to me when I was alone, sometimes I was accosted by these consoling friends while in company, frequently while real persons were speaking to me. These consolatory addresses consisted sometimes of abrupt phrases, and at others they were regularly connected.

Though both my mind and body were in a tolerable state of sanity all this time, and these phantasms became so familiar to me that they did not cause me the slightest uneasiness, and I even sometimes amused myself with surveying them, and spoke jocularly of them to my physician and my wife; I yet did not neglect to use proper medicines,

* This is a fearful coincidence of hallucination in two corresponding senses at once.

especially when they began to haunt me the whole day, and even at night as soon as I awaked.

At last it was agreed that leeches should be again applied to me, as formerly ; which was actually done, April 20th 1791, at eleven o'clock in the morning. No person was with me besides the surgeon ; but during the operation my chamber was crowded with human phantasms of all descriptions. This continued uninterruptedly till about half an hour after four o'clock, just when my digestion commenced. I then perceived that they began to move more slowly. Soon after, their colour began to fade, and at seven o'clock they were entirely white.* But they moved very little, though the forms were as distinct as before : growing however by degrees more obscure ; yet not fewer in number as had generally been the case. The phantoms did not withdraw, nor did they vanish ; which previous to that time had frequently happened. They now seemed to dissolve in the air ; while fragments of some of them continued visible a considerable time. About eight o'clock the room was entirely cleared of my fantastic visitors.

Since this time I have felt, twice or three times, a sensation as if these phantasms were going to reappear ; without however actually seeing any thing. The same sensation surprised me just before I drew up this account, while I was examining some papers relative to these apparitions which I had drawn up in the year 1791.

I have been prolix in the recital of the above case, because it is a fair example of those effects of Spectral Illusion which credulity and ignorance have ascribed to the ghosts of departed persons ; for it may be here observed that not only the organs of vision, but that of hearing also, are affected with these illusive sensations, and that when both occur together, as in the above instances where the phantasms spoke, a fearful and imposing imitation of reality is the consequence.†

In every age and in every country, as Addison justly observes, there have been popular stories of ghosts which a certain portion of society have credited ; and every now and then they have been attested by eye witnesses with a degree of accuracy in all parts of the world, that would render it absurd to attribute them to casual invention and importune : there must be some general cause for a belief so universal : and I am glad to be able to unravel that cause in a physiological way, or referring the effects in question to disorders of

* I have remarked that in the various relations of Spectral Illusion which I have examined they have turned white before disappearing, losing their colours before their forms, as if certain parts of the brain lost the peculiar irritation necessary to Spectral Illusions before other parts.

† The possibility of the same organ being employed for real prophetic visions, is described and defended in *Somnopsychologia*, London, 1823.

the sensorium that admit in all their varieties and gradations of the most systematic and satisfactory explanation.

Another question however of much less easy solution arises from the remarkable coincidences, from time to time recorded, between Spectral Illusions and subsequent effects to which they seemed to relate. Instances of simple and unforeboding apparitions of the nature above described are not unfrequent in persons who have the upper and lateral portions of the front lobe of the brain much developed; and where no consequences result there can be no mystery in the phenomena. But how shall we account for the spectra which are so accurately recorded as the forewarnings of death and other momentous events? The spectre which appeared to Lord Littleton, and foretold the hour of his death, the warning voice heard by Quarrens, the vision of Achilles, the shade of Brutus, the curious relations of Cardan, Koller, and of numerous other writers, in every country of the world, will furnish ample instances of the cases I allude to. The same obscurity overhangs prophetic dreams, as well as visions, and indeed belongs to all those events which seem related to each other, by some hidden law of coincidence, without having any apparent natural connection. I could fill volumes with well attested stories of this sort, but this is not the proper place, they are merely alluded to here, in order not to omit any of the circumstances which sometimes attend a disorder so extraordinary. Of their causes, and the real nature of the apparent connection between the sight of a phantom, and the death, at a distance, of the individual whose person it represents, I will say nothing; as all reasoning on the subject must be rendered futile by our want of knowledge of the relation that may subsist between all the coincident and consecutive phenomena of the universe, regarded as constituting a whole, of which our imperfect perception of its parts, renders us incapable of comprehending the harmony that pervades it.

Images of Spectral Illusion differ from those of Dreams, in being seen by persons when awake. An easy transition

from one to the other seems to occur at times in the restless hours of the night, when the discrimination of the two states becomes difficult. The terrific dreams of the English Opium-eater, might soon have been converted, one would think, into frightful Spectral Illusions; just as Images of Thought in dosing gradually change into those of Dreams as soon as sleep becomes sufficiently perfect.

As every reader may not know to whom I allude, it may be observed that the author of the work adverted to brought himself, as he says, into a state of frightful susceptibility to images of sleep by the habit of taking opium. His nocturnal visions, in which he was often incarcerated in dungeons, or fixed forlorn on the Pyramids of Egypt, or at other times terrified by the change of all objects, even the legs of tables and chairs, into the frightful figures of crocodiles, or scared when looking in dreams on the ocean to see its wary surface covered with hideous human faces, furnish an example of the more terrible forms under which dreams may appear to particular minds when the nervous system is disturbed by some of the predisponent causes of disorder.

Some persons have compared Spectral Illusions to Ocular Spectra, of which Darwin has described the several laws in *Zoonomia*; but the two phenomena differ in this, that ocular spectra move with the motion of the eye, like the *mascae volitantes* or those little floats like bubbles, which seem to fall in the sky as the eyes incline; and the seat of them is probably in the retina; whereas Spectral Illusions of the kind we have been describing, have an apparent proper motion of their own, like the objects of dreams, and it is thus that their specious reality is not easily detected by the patient.

Ocular spectra, however, are also affected by the weather. Flashes of light too before the eyes, similar to those that precede apoplexy, are, in nervous persons, the general precursors of rain.

Changes of weather also, and particularly a change to east wind, in the night, produce frightful dreams by distorting the stomach and the circulation of the sensorium.

I need hardly enumerate any more particulars; the twofold origin of all these phantasmal disorders, like other diseases of a more permanent character, must be already rendered evident to all who can reflect. Suffice it to say, therefore, that the atmospherical nature of the influence exerted on the brain, when the mind is disturbed, as above described, becomes manifest, from its greater and more general operation at the changing of the weather, and about the periods of new and full moon; while ocular spectra, dreams, phantasms, incubus, somnambulism, and illusive sensation in all its varieties, in different individuals, are modifications of its effects, resulting from a diversified cooperation of predisponent constitutional causes.

16.—Of Disorders of the Hair and Scalp.

Epidemics have occurred which have produced diseases of the scalp, and falling off of the hair. There is, indeed, scarcely any part of the body free from the attacks of disease from specific atmospherical causes, but those of the hair deserve particular attention, from a certain mystery that attends the doctrine of minute organization. I am persuaded that the hairs are organized and exist as living bodies subject to derangement of vascularity. The *Plica Polonica* illustrates that fact; for the shaft of the hair bleeds on being cut. This disease is certainly endemic belonging principally to the Poles and Tartars; but it is also effected by the air, for it occurs chiefly in autumn and in some years more numerous than in others. In some cases the hairs grow to a great length, become coarse, and get matted and entangled, so as not to be easily combed out; hence the name of *plica*.

The *Xerasia* of the antient Greeks was the very opposite of this disease, and consisted in the drying and falling off of the hair, from apparent want of nourishment.

The appearance of the human hairs appears to me to vary in a manner conformable to the notion of their being

affected by electricity, and in time, the effects produced on the head by the artificial electricity, may illustrate the effects of the electricity which is natural.

§ 17.—*Of Gout and other Constitutional Disorders.*

What Mr. Abernethy has said of the connection between disorders of the whole constitution and those of the digestive organs, together with all the observations of Dr. Lambe on the same subject, only relates to the predisponent causes of those maladies; while it is the province of the meteorologist to point out what may be regarded as the exciting cause. Gout, for example, may be brought on by the long continued use of stimulating animal food and strong liquors; but I would ask, does this aliment regulate the return of the fits? Similar errors of diet may in other constitutions lay the foundation for other constitutional disorders; but it would be difficult to show that their periods depended on food. I believe that gout, rheumatism, and inflammatory affections in general, owe their diathesis to the abuses of the appetites and a misapplication of the benefits of civil life; but that their exciting causes are atmospherical. Indeed, their periodical returns in particular seasons and on changes of the weather clearly show it.

Finally, I have found that the success of the treatment of gout often depends on its timely employment, and on a due regard to its periods.

§ 18.—*Of Consumption and Pulmonary Diseases in general.*

The slow and destructive diseases of the lungs, constituting what is called phthisis, as well as the more transitory forms of dyspnoea, are prodigiously influenced by the state of the air. Although consumption rarely appears as an epidemic, yet it is greatly influenced by atmospherical causes of a local nature. There appear, to me, to be two great

mistakes made in the treatment of phthisis : one is the allowing the patient stimulating animal food, under a false notion of keeping up the strength, instead of endeavouring to nourish with the milder farinaceous or gelatinous foods. The other is the omission or delay of change of air. If a distant voyage to a mild air be impossible, then I say, the patient should try what might be done by a shorter journey to a well selected spot. Almost any change is better than no change, in the diseases of organs so immediately under the influence of varieties of atmosphere. Consumption is rendered a more formidable disease in England than it need be, in consequence of being so frequently misunderstood and improperly treated. Mr. Abernethy has shown the utility of alterative medicines in this disease, combined with nutritious unstimulating food. Dr. Lambe has further illustrated the benefit of vegetable food, both as a preventive and cure, and I believe that where a strict attention to diet, aided by simple medicines, and a suitable change of air can be resorted to in the *early* stages of the disease, few cases of consumption need be despaired of as incurable.

§ 19.—Of *Asthma*, and the peculiar susceptibility of *Asthmatic Patients*.

Asthma is one of those complaints that tend more than any other to show the capricious susceptibility of the lungs to the varieties of the air. Not only do changes of weather affect asthmatic subjects in the most extraordinary manner ; but there is also a difficulty of finding a local habitation that will agree with them. Some patients are incapable of breathing freely in London ; others cannot bear the country air ; some can only breathe well in certain spots in the country, or at particular elevations. These idiosyncrasies vary too even in the same subject.

An Irish gentleman once consulted me, who could not live in his house at the bottom of a hill, but who could breathe like other people at the top of it. His *Asthma* came

should like to know, if possible, over which exact spot the abruptly terminating WSW end of its arc was situated? If we were to credit the proofs which antient writers have given us of a remote electrical origin of pestilence,—which they tell us is brought by comets and signified by atmospherical meteors, a doctrine rather possible than likely,—the present comet would then cooperate with the light in question in corroborating this doctrine. But unfortunately, however clearly we may make out the origin of epidemical pestilence to be atmospherical, and depending, as I have shown, on electricity, the manner in which such electrical agents are connected with those of other planetary or cometary bodies, in the great chain of causes, is still a profound mystery. It seems however to be consistent with all that, with our limited scope of perception, we can see of the unity of design in the universe, to suppose that all its parts have a mutual relation; and consequently that the diversified phenomena which have been alluded to, may be corresponsive agents through which the providential principle of Nature operates for purposes of general economy.

§ 21.—*Of several Anomalous Disorders which have assumed an Intermittent Form, required particular Periods, or appeared as Epidemics.*

Of late I have observed that many disorders have assumed an intermittent character which have seldom been considered as aguish, but whether this is to be regarded as indicating a change in the type of diseases, and being only a part of a general change going on in their features, from atmospherical and other causes, or whether it is merely more observed of late, I will not pretend to determine. Two ladies at different times applied to me in consequence of violent pain about the head and face like the rheumatism, which occurred only at a certain hour of the day, and that for a long time together. One case, after resisting various attempts to cure, yielded at last to a violent dose of rhubarb and calomel, and subsided suddenly. The other

case, for a long time equally obstinate, first became continuous on a change of weather, and then subsided. Another case was that of an elderly gentleman near London, who for many years had experienced repeated and sudden attacks of violent pain in the teeth, flying as he expressed it, into his head, temples, or cheek bone, and in reality, as appeared, affecting in succession different portions of the fifth pair of nerves. These attacks, he said, came on whenever the wind got into the east. On enquiry, he said his stomach was right enough, but I found in this as in other cases that he had every symptom of disorder of the digestive organs, combined with nervous irritability, nevertheless alterative medicines and calomel, had but little influence over the complaint: opium, in doses of three grains, given twice or thrice a day, succeeded better; but after all he would not change his habits of drinking spirituous liquors, and the disorder, the paroxysms of which became Periodical, continued for years to afford repeated proofs of a peculiar susceptibility to the influence of east wind.

Two cases of periodical toothache occurred which yielded to calomel followed by bark: in one case, violent exercise effected a cure. But another occurred which, though not a case of mine, deserves to be particularly noticed: it was related to me by an old and intelligent gentleman of great veracity. He had for a long time suffered from violent pain in a tooth, and the jaw of the same side, which returned every night on going to bed, at eleven o'clock: it got worse as he first got warm, but he fell asleep in the course of the night and felt perfectly free till the next night: after trying various local remedies, and the nostrums of numerous friendly officious wisecracks, he at length resolved to lay aside quackery, after one good trial, as he said, of the bark. He took just before going to bed a considerable dose of cinchona: in a few minutes afterwards feeling what he called cold all over coming on, he said, I am sure something remarkable is going to happen. The remarkable thing indeed soon arrived, and it was one of the

most tremendous shiverings ever witnessed in any ague fit, but it was only of a few minutes' duration, for in a few more he was in bed, in a comfortable perspiration, and from that day, now sixty years ago, never had the least symptom of toothache. This case was the more remarkable, as the gentleman never recollected having taken any medicine before or since: he was a man of active mind, abstemious habits, and prodigious regularity, eating but twice a day, and always at stated hours. He lived to eighty four years old, without ever having consulted a medical man or taking any other physic than now and then a few grains of rhubarb, and he died in bed one morning, in full possession of all his faculties to the last, without pain, as if by the gradual loss of vitality in all the organs at once, like a candle that goes out without simmering.*

I have seen cases of earache, hemicrania, and rheumatism of the head and face, which have acquired tertian and quotidian periods: these have, moreover, been worst at the monthly periods of irritability. Similar pains occur also before storms and electric changes of the weather. As I have in a former section discussed the probability of all these having an atmospherical cause, I need not repeat the

* I have sometimes watched the process of dissolution in various animals with a view of ascertaining the precise truth of Mr. Hunter's notions about the *specific stimulus of death*. In few instances is death slow and natural enough to observe what is the uninterrupted process, but I think I have observed that, before the very stimulus which occurs in *articulo mortis* itself, there is a temporary revival, a short lighting of the mind up just before the disunion of the sentient capacity from its organs; and it may be a fit subject of enquiry how far this may be consistent with the laws of animal galvanism.

With regard to the lucid interval before death, whatever may be its physical proximate cause, I think we are warranted in considering it a kind provision of Nature, in order that we may be clear at that critical hour, and as capable as the nature of disease will permit, of performing the last duties of mortal life.

To me it seems that in some cases death, naturally slow, would be almost infinitely protracted, if something did not put an end to the life at last: finally, I believe, that the life of persons lingering of age, or of many chronic diseases, may be sometimes finished by some external influence during the periods of augmented atmospherical excitement?

arguments here. But I may just mention that phenomena in the animal economy which take place at changes of the weather, are also liable to occur periodically, from several changes of a similar nature in the electric atmosphere which go on slower and are less obvious to the casual observer.

It is a difficult subject of enquiry by what law of epidemia disorders, generally of a continuous or acute kind, should become tedious intermittents: but such is the fact, and for all the information that I can give on the subject, I must refer to the first chapter of this essay. This tendency however has been very evident of late years. Dysentery, choleric pains, spasms of various kinds, and rheumatic, and what are called nervous pains, have frequently assumed these periods, and have yielded to the ordinary remedies for the ague.

The last disease that I shall mention here is tic douloureux, of which I attended one case, that of an elderly lady in Middlesex, who had been afflicted for some months with periodical paroxysms of pain of this sort, which appeared to be seated in the fascial branch. After having tried arsenic, opiates, and various drugs in vain for this terrible complaint, she at length applied to me. Being an athletic subject, and habitually a good feeder, I tried depletion and mild mercurial purgatives with great success, and reduced the disease, which in her case I believe never will be quite cured, to almost evanescent paroxysms coincident, as to the times of their occurrence, with the old periods of pain, but so slight as to be scarcely worth consideration. But it is remarkable that the lady left her residence, went to live in an air that did not suit her, got the disorder again in its full force, and being discouraged by its return, left off her salutary habits of temperance, and eventually died.

But the number of dissimilar diseases which have appeared as decided epidemics, or have got intermittent periods, is beyond calculation, and it seems that nearly every disorder may be more or less under these external influences,

which I have regarded as the excitant cause; while their number and variety will the less surprise us, if we reflect on the infinite diversity of predisponent causes existing in the constitutions of different individuals. Even the healing of wounds will fluctuate with the state of the air, and they heal less readily in some situations than in others.

Of the extraordinary specific power of epidemia as an excitant, I shall mention one example in conclusion, which occurred to me in Oxfordshire, about fourteen years ago, and in which, as in other cases, there must, in the constitutions of the individuals attacked, have been some peculiar predisponent causes favourable to the occurrence of so extraordinary a disease. Several persons in one family, and others belonging to different families resident in two or three contiguous villages were, in spring, attacked with a phagedenic ulceration of the thumb, of so malignant and untractable a nature that, by the end of May, several of the patients were literally *pollice truncati*: others were brought into the hospital, and being treated with simple dressings, and a course of mercurial medicines got well. The disease did not seem to be contagious, and it subsided with the season in which it first occurred. I have not a doubt, from facts that have been related to me in different countries in which I formerly travelled, that numerous similar instances might be found occurring every now and then, and exhibiting proofs of the very singular symptoms that these atmospherical excitants may now and then set up in predisposed constitutions.

Among the inferior orders of animals, whose disorders illustrate ours by the analogy afforded by their comparative pathology, numerous cases have occurred of local affections produced by a prevalent epidemic. There are histories of epizooties to be found, in which these facts are described with all the requisite accuracy of detail; many of which will be inserted in our historical sketch of epidemics. At present I shall conclude by observing that, with respect to human diseases, there is scarcely any one form of them

which has not at some period or other appeared as an epidemic. The natural inference to draw from this observation is, that in other cases, less obviously epidemical, a more local or limited operation of similar atmospherical causes is rendered probable: since it has been always admitted that similar effects must be the result of similar causes; and that the assumption of more causes than are necessary for the effects, is a violation of the simple and invariable rule of philosophizing.

§ 22.—*Of some remarkable Periods observed by Disorders.*

Besides the regular periods of intermittents, some disorders have acquired as it were the habit of returning at particular hours of the day or night, as I have before hinted at: rheumatism, and other inflammatory affections, erysipelas, headache, the pains in the periosteum of bones, or in the parts where fractures have united, or wounds healed, have under a variety of circumstances acquired the habit of periodic returns: fits of melancholy, hysteric affections, and various forms of nervous diseases, have done the same, not only occurring at times of the month, but at particular hours of the day. In all these cases it may be a fit subject of enquiry, whether the periods in each case were superinduced by habit, or were the result of external influence.

Since I wrote the first part of this present section, I have seen some cases of epidemical angina pectoris, or rather of some obscure disorder, which in symptoms resembled that dreadful malady, but which fluctuated with the weather and eventually subsided, without being much affected by the medicinal measures resorted to for the alleviation of the symptoms.

One of the most remarkable things about some diseases is their annual period: cases occur of not only the gout, or the ague, but of erysipelas, melancholy, and very numerous forms of disease, which different individuals have regularly incurred at the same time of year for years.

together. Some children are much subject to this annual periodicity ; while there are yet other persons who are ailing every year at two or more seasons.

One hardly knows how to begin to reason on such cases : the diurnal paroxysms of disease are easier to explain ; as they may be sometimes brought on by habit, like the periods of sleep, and Darwin has suggested a plan of getting rid of some of them by violent irruptions of their periods ; by bark and such means. But how any habit can have brought on annual periods it is hard to say, the easiest method is to shift the onus on the wings of the air, and avail ourselves, in the absence of positive proofs, of the assistance of analogy which affords so strong a presumption that in this, as in better made out cases, a peculiar predisposing susceptibility on the part of the constitution, rendered the patient subject to irritation from some exciting power in the annual change of season, which the constitutions of other persons were incapable of being affected by.

A great deal has been said about the wholesomeness of the Sea Air, and its curative power in disease ; and this alleged salubrity is said to be very great on the south coast of England. I am induced to think however that it is much overrated, and that though maritime situations are healthy, and exercise on the coast forms a good change from the inactive habits of a town life, yet the particular seasons at which the sea is visited has much to do with the health of those who resort to our shores. The late Dr. Gregory, of Edinburgh, made this remark to me many years ago, and what I have since seen seems to confirm it. Nevertheless the sea coast has certainly many advantages over an inland residence ; but it must be remembered that there is a great variety in the different watering places, as to healthiness ; and that not only the coast, but the surface of the ocean itself, is not exempt from the casual visits of epidemical disorders, as will be found to be the case if we consider that fleets have suffered dreadfully from sickness, when pestilence has raged on shores near to them, and that in some instances the epidemic has fallen principally at sea.

§ 23.—*Of the comparative Longevity of Persons in different Places, which has a decided Connection with Atmospherical Causes, and would be otherwise unexplainable.*

Besides the predisposition to different particular forms of disease inherit in nations, cities, and other localities, the result of the natural state of the air of those places combined with endemical predisponents: longevity itself, or the average term of life, will be found to vary exceedingly in different districts. Close and confined situations, abounding with trees, bogs, decaying vegetable, or animal matter, and subject to fogs, are less healthy than dry, open, and elevated situations; and some soils are preferable to others; but there seems, besides this, something particular in the air of certain places which renders them comparatively salubrious or otherwise. Cardiganshire, in Wales, for instance, presents a large proportion of old persons and is particularly healthy, and I may observe without entering into particulars, that throughout Europe, and perhaps in every part of the world, certain spots are found dispersed as it were here and there sporadically, which not only afford examples of a high average longevity, but which are also less liable to the incursions of epidemics, than other places. To find out these favoured seats of Hygeia must be the object of invalids who change their residence for the sake of their health, while it will be the business of the scientific physician to make a further scrutiny into the specific merits of the air of each, for those patients whose idiosyncrasies with respect to atmosphere would seem to demand the advantage of a more particular selection.

A few examples may illustrate my meaning: consumptive patients generally do well in the Madeiras, but there are exceptions to this rule; others have derived no benefit from Penzance, who have got well at Paris. Hastings suits some weak and tender subjects, while others fall a prey to an autumnal cholera morbus that often prevails there: some cannot live in the South of France where the bize blows: others who can bear that wind, are obliged to fly the schiroco. The Etesian winds did not bring health and vigour to all; and

persons are not wanting to whom the terrible East wind is no annoyance. These are inexplicable peculiarities.

The remarkable healthiness of some situations reminds me of the story of an old invalid subject to humorous blunders, who, when he had retired from business, set about seeking a healthy asylum for his remaining years. On arriving at a particular salubrious watering place in Ireland, the contractor for houses, anxious to sell his property, assured the gentleman in the emphatic language of hyperbola that the place was so healthy that *people never died there*. Ah, said the gentleman, that's enough, Pat, this is just the place, then, for me to end my days in.

§ 24.—*On the possible Changes in the healthiness of particular places.*

One thing very remarkable is that places change much, in the course of ages, with respect to their relative unhealthiness, as will appear to any body who will take the trouble of examining tables of mortality. That cutting down large forests, draining off stagnant pools, and cleansing cities of filthy sewers, will add to the wholesomeness of the places so freed from sources of illness is a fact well known; but independently of these artificial causes, large tracts of land, and even whole countries changing, seem in time to commute their healthiness. Epidemics that occur in them may help to do this, but if they do so, it is not a constant mode of their remote operation. Friesland, for example, notwithstanding the severe epidemics that have scourged it, remains much more healthy, and affords a much higher scale of longevity than Holland; although the latter has of late been less subject, of the two, to pestilence. Perhaps the greater temperance and simplicity of diet contributes to give the Frieslanders a longer average of life. It would be a very desirable thing if regular returns of the average mortality of places were made out once in ten years. The knowledge of the varying healthiness of places becomes as important, to those who change a permanent residence in order to enjoy more general health, as a knowledge of the *time* and range of any particular epidemic is to those

who would fly its effects. Ignorance of the salubrity of the place whither they are going, may in either case make them go further only to fare worse, by leaping out of the frying pan into the fire.

The enquiries that have of late been made into the cause of the healthiness of particular spots, have all appeared to me to be defective, inasmuch as they have not reached the source of those occult qualities of atmosphere, of which, without knowing their natures, we have perpetual occasion to recognize the effects.

Why, for example, consumption should be very rare at Aix la Chapelle, and yet common at Montjoye, barely thirty miles off; why that disease should be unknown about Alexandria, and yet frequent at Aleppo, for which we have good authority, are questions to which, after all that has been written about the elevation of the pulse in lofty situations, and the effects of barometrical pressure on the action of the heart, seems yet to remain, at least to my mind, unanswered. To bring the subject into a narrower compass, I may observe that though the difficulty of determining why the sea coast is curative in consumption may be great, yet it is a much greater question to solve,—why, of a number of different maritime situations, some are found almost as fatal to phthisical patients as others are favourable to them? For though generally speaking elevated situations seem to be unfavourable to this disease, as has been well proved by Dr. Weils and others, yet there are exceptions to this rule, which seem capable of overturning all the common modes of explaining it. The same arguments will hold good with regard to the general wholesomeness of situations. After an extensive enquiry into epidemia, I cannot find that the effects of temperature, pressure, drought, or the ordinary changes, are by any means capable of explaining it; and it seems to me that, after all, it must be referred principally to those peculiar electrical causes, to which I have so often alluded, and which owe their origin and local effects to arrangements in the atmospherical economy, of which we have at present but a very imperfect notion.

CHAPTER III.

ENQUIRY INTO THE NATURE OF THE ATMOSPHERICAL EXCITANT,
AND OF ITS RELATION TO THE PREDISPONENT CAUSES IN
THE PRODUCTION OF DISEASE.

§ 1.—*Statement of the two Classes of Causes to be investigated, and of the necessity of their respective Variety and mutual Influence.*

IN enquiries into the manner in which disorders of the animal machine are brought about, there are always at least two causes to be considered, namely, the *exciting* and the *predisposing* causes. And this knowledge of the two sets of causes becomes particularly necessary to those who would cure diseases; because *both* must be understood, that both, as far as it be possible, may be removed.

The facts already stated show, beyond doubt, that the great exciting causes of disease are in the air, that they vary in their nature, at different times, in a manner and from *remote* causes wholly unknown, and appear to constitute a part of the general phenomena of the atmosphere. But the reason why only a portion of the populace, on whom the excitant falls, is found to be effected by its influence, while others escape, must depend on the predisposing causes; or in other words, on the constitutions and habits of the individuals.

It is clear to me that both sets of causes are diversified in their nature; for neither varieties in the excitant, nor in the predisponent alone, could produce the almost infinite diversity of diseases; while it is easy to conceive that any number of varieties might result from the combinations which could be produced, on the supposition that *both classes of causes were in their own nature diversified*, at different times and places

I can exemplify my meaning mathematically, by supposing the excitant and the predisponent represented by two cubes, each marked on its respective sides with a figure,—1, 2, 3, 4, 5, and 6, like those of dice. Let cube A represent the exciting cause, and cube B the predisponent. Let A B represent disease or the product of the two necessary causes, and let N, the number of varieties of figure capable of being produced by the combination of the cast of the two cubes, also represent the number of existing disorders. Now if cube A could only fall uniformly in one way or on one side, and cube B could fall on any one of its sides, as chance would have it, then the greatest variety produced could never exceed six. For, let the one side on which cube A always fell, for example, be A 1. the sum of the chances of variety would be $A\ 1 \cdot B\ 6 = N = A\ B\ 6$. But in case of the same variety of incidence being admitted to cube A, that is, that it might fall on any side, it would result that every one side of A might be coincident with any one side of B, and the sum of the probabilities of variety would be, $A\ 6 \cdot B\ 6 = N = A\ B\ 36$.

By this mode of reasoning, we shall be made to see, that if the varieties of disease were dependant on the predisponent causes alone, they could only equal their number, on the supposition that the excitant was uniform in its operation. Now I am able to show that the varieties of diseases greatly exceed in number that of any supposable varieties of constitution, habits of life, and so on, and that in consequence we must admit also a great variety in the atmospherical excitants, in which case the varieties of diseases, arising from the possible combination of any one of the excitants with any one of the predisponents, might be almost infinite, or at all events would increase in the compound ratio of the number of their causes.

That this is conformable to all the various details of diseases, I have sufficiently shown: it remains, therefore, only to investigate what those causes are, in order, as much as possible, to avert or counteract them by art.

We ought not to neglect either set of causes ; those persons, I think, have erred who, viewing the power of air over the body, have regarded constitutional remedies as useless, and have depended on change of air alone ; while some very sagacious physiologists have been guilty of the counterpart of this error, in representing simple alterative medicines and wholesome dietetic habits as alone capable of either curing or averting diseases.

Mr. Abernethy's plan of alteratives, and indeed his whole doctrine and practice, to which the medical profession is so much indebted for a restoration of our art to its primitive simplicity, may illustrate my position. His unexampled success in diseases in general shows the safety of simple and rational practice, and the futility and danger of tampering with the constitution by drugs and nostrums ; while the failure of his rules, in cases where the epidemic influence is powerfully exerted, of which I have had experience, shows how completely the excitant is capable, at times, of overpowering those remedies that act on the predisponent causes of disease alone.

§ 2.—*On the Nature and Modus Operandi of the Epidemic Bane.*

Writers have endeavoured to lay down what they call the Laws of Epidemics, but to me it does not appear that we can at present speak positively as to any general laws which they may obey, and physicians have too often mistaken their own speculations for discoveries. I can, however, state some curious facts, which, when viewed collectively, and compared with other facts in pathology, may perhaps lead in time to a more systematic knowledge of their causes.

I have throughout this Essay considered the cause of epidemics as twofold, namely, the state of the air, and the state of the constitution ; this is the first general division of causes. Now the states of the body or the predisponent constitutional causes are very various, and in these must be sought for the reason why, of the individuals on whom

the epidemic poison falls, only some are sufferers. But the causes I am now about to consider are the exciting causes which come in the air, on which much of the peculiarities of the disorder depends. For different epidemics seem to be as it were specific banes floating in the atmosphere and exciting such a peculiarity of symptoms in the respective objects of their attack as could never be referred to varieties in the predisponent causes alone, however diversified the latter might be, by hereditary temperaments, climate, and habits of life.

One general effect of epidemic irritants is that of inducing disorders which occasion lesions of the skin and mucous membranes of the body, as for instance eruptive fevers of various kinds; indeed we observe of most of them that they tend when they once exist in an aggravated form to break the continuity of the surface, whether it be by defined pimples, pustules, and vesicles, or anomalous affections of the membranes. From this general view, we may proceed to consider the specific power of individual epidemics, in their progress, to determine the morbid action to particular surfaces, or organs, resembling in this respect other specific animal and vegetable poisons artificially introduced. I might refer to a few examples, as to the vernal fevers determining their action to the milliary glands of the skin, to the defined spots of small pox, of spotted fevers, and so on, or to autumnal cholera morbus and dysenteries, which spit their spite on the intestines, to epidemic pleurisy affecting the chest, to cough tearing the lining of the windpipe and bronchiæ, or to the numerous ulcerations of the mouth, nose, eyes, and other parts, or which have a continuity of surface with the alimentary canal. But I have spoken already of these varieties, and of others still more peculiar. Again the epidemic poison acting variously, at different times, on different parts of the canal, may not only cause a variety in the immediate symptoms, but may also produce a difference in the sympathetic effects; since the remote sympathies of the head and other parts of the body, with the alimentary canal, may be different.

in proportion as different parts of that canal, with which the sympathy exists, may be affected by disease. Such a view of the subject as this will also account for the progressive relief afforded to a congeries of local disorders, by the successive operation of different cathartics, which had a known action on different portions of the alimentary canal. By a close examination of what parts of the digestive apparatus are affected, we may be therefore directed in our medical practice. When the liver is the seat of morbid action, the mind seems to suffer from melancholy, as I have elsewhere said is the result: we then employ repeated mild mercurials;—and so on of other organs.

Spigelius, under an idea that the determinate inflammations of the intestines, in some epidemics, led to ulcerations of the intestinal coat, used to try to cut off its malignity by bleeding in the early stages. Morgagni noticed also destructive ulcerations in cases of fever, which he discovered by post mortem examinations. But though the whole history of epidemics shows their specific action on different tissues and organs of the body, yet the nature of the cause remains a mystery. I have plenty of facts before me to show that electricity is much concerned as a cause, but whether simply, or with what compound aids, remains as yet undiscovered. The periodical fever of the small intestines arresting digestion and producing by sympathy the nervous headache, described before, which occurs at changes to east wind, and often near to the lunar periods, or before storms, is one instance of specific and determined action, as purely electric as any I know of; but even here it is impossible to say what particular morbid poisons this wind might have gathered up and modified by its electricity.

Another important fact, in epidemics is, that when an epidemical state of the air is once set up, it seems to have, in certain places where its attacks happen, a sort of progressive malignity and crisis, which some writers have imagined to be referrible to a continuance of the same irritation on the body, rather than to an augmented

virulence in the weatherbane itself. A circumstance, however, favourable to the hypothesis of an irradiating malignity in the poison itself, ought to be here mentioned, before I conclude this section. When an epidemic is raging violently in a particular place, neighbouring places will suffer from slighter epidemics of a similar type, whose proportionate virulence varies inversely as their respective distances from the concentration of the storm of woe. Just as those persons who are in the vicinity of a falling thundershower get a slighter wetting from its skirts. Fanciful as this fact may seem, I assert it on the security of a long and patient examination of the topographical history of numerous epidemics.

What is still more curious is, that in other instances there are concentric circles or tracts, as it were, existing in alternate order, of epidemics of opposite characters; just as there are alternate circular portions of air electrified positively, non electrified, and negatively electrified, in the common centre of which is the intense accumulation of a thunderstorm.

It is difficult to determine, in many instances, the extent and range of epidemics. The influenza and other epidemic catarrhs, have sometimes had a wide range in Europe, which would warrant the supposition of an essential change in the quality of the air of a most extensive kind. Sometimes this disease prevails more or less over nearly a whole hemisphere at once, and then goes to another, as the influenza, for example, which in 1761 infested America, but became prevalent the succeeding year in Europe.

Another fact is, that epidemics prevailing on shore, go to sea with the land winds and disorder the mariner on shipboard. The ships in the Mediterranean have often suffered from a modified version of a pestilence that was raging in the Levant. Neither do islands escape any more than continents; and often modified likenesses of continental fevers prevail in the neighbouring islands. Cadiz at present, according to accounts, exhibits in its destructive

fever the countertype of the pestilence of Gibraltar. History furnishes many similar instances.

Mr. Webster, an American writer of some years ago, seems, in his history of epidemics, to have collected many very curious particulars of this sort, but they are hastily put together, and want order. I have but just seen the book, and have had too superficial a perusal of some of its contents to make much use of them.

The necessity of a sufficient predisponent cause for the production of actual disease, when a pestilential stimulant is abroad, in other words, the curious failure of the specific epidemical poison to act on endemical peculiarities of constitution, has often been illustrated by the choice of nations, which Febris has selected for her victims in places where men of all countries have been assembled together. Cardanus says of the plague of Basle, that the Swiss were affected, while the Italians, Germans, and French escaped. In the plague of Denmark, the English, Dutch, and Germans were, for the most part, untouched. When the sweating sickness first broke out in London, it affected the English alone; although the same disorder has, at a subsequent period, appeared in other countries.

In the desolating pestilence of the American Indians in 1618, the Europeans present escaped. Sometimes the plague will single out particular families, as once happened at Nimuegen, in Holland.

The fever at Universities at times has affected only the students. And at Altdorp, in Franconia, a case of this sort of selection is related of so extraordinary a nature that I should be afraid to relate it, authenticated as it is by Van Sweeten and by Heister.

Similar selections have happened among domestic animals in cases of epizootics: the best fed have suffered most; and in plants, when epibotanic pestilence has prevailed, the garden specimens have died, while hardy wild plants have escaped.

Sometimes an epidemic in one country will have

collateral epizootics in another; as in the pestilence of Hungary, when there was a murrain of cattle in Germany and Italy.

Finally our attention should be directed to the general changes in the type of diseases in the lapse of ages, for they correspond to alleged changes in the climates of particular countries.

All these facts, and innumerable others that I could relate, do not exactly show how epidemic poison operates, but they show, in all its varieties of operation, the necessity of there being predisponent causes in the body; and hence encourage us to hope that we may be able to lessen or prevent its effects, by attention to diet, regularity, and other prescribed rules of health, with such alterative medicines as long experience has pointed out. Of the two greatest ancient writers on pathology, it may be said that Hippocrates understood the cause of diseases best, and showed their atmospherical source, but Galen was better acquainted with the remedies, for he ably illustrated our power of preserving health and curing disorders by abstemiousness, combined with those other habits which give strength and tranquillity to the body, and thus remove the one cause, whose union with the other is necessary to disease.

The opinion I have advanced, that electricity is a principal agent, would receive great confirmation if I could show, in addition to what has been said already, that electrical phenomena of an extraordinary sort, have preceded or accompanied the most remarkable instances of pestilence; like the Zodiacal Light of last Michaelmas Day, which arising from the west and being an evanescent arc over the zenith to the east, would in early times have been said to be a forerunner of the present fever of the Peninsula. I have examined a great number of histories of epidemics, to see if there could be found any connection between them and atmospherical phenomena, and also what might be the influence of the lunar periods on diseases, and whether years in which comets were seen, were also more productive of

disorders than others? And it certainly has come out on enquiry, that volcanoes, earthquakes, and meteors, of various kinds, have prevailed much in pestilential periods, but not exclusively so, and a habit of too hastily inferring effects from phenomena which were rather accompaniments than causes, seems to have beguiled philosophers into opinions respecting the remote origin of epidemics, which a closer examination of facts may possibly not warrant. That the reader may judge for himself, I shall give a short sketch of a few facts recorded in history, in another place, and shall collate the epidemics with the state of the season and the occurrence of remarkable phenomena. By this means, it will appear that comets have usually been accompanied with that sort of hot and dry weather which may be supposed capable of favouring inflammatory epidemics; and that in the most pestilential seasons it has often, though not always happened, that meteors, volcanic eruptions, and other the like electrical phenomena have abounded.

§ 3.—*Further Speculations as to the Nature and remote Origin of the Epidemic Bane; the Opinions of certain Modern Writers thereon refuted by facts in Natural History as well as Pathology.*

When we have demonstrated the epidemic state of the air to consist in some stimulant of a specific kind exercising, at various times, its morbid influence on predisposed constitutions; our enquiries ought next to be directed to its nature and remote origin. And first, to speak of its nature, it may be observed that we must derive what knowledge we possess of this, from its mode of operating, which was discussed in the last section. As its action is various at different times, so must be its nature, since, diversified as the predisponent causes may be, we cannot suppose them equal to the production of the varieties of epidemics, on the supposition that the exciting causes were uniform, as I have shown already. The epidemiographer seems to have made it out that there was a sort of pestilential prin-

ciple overspreading the earth in different places, and shifting its quarters from time to time, which became the general vehicle of excitement, and he supposed also that comets exercised an influence on the surface of the earth through the medium of this principle, producing not only epidemics but earthquakes, volcanic eruptions, famine, and in short all those occasional disasters which fancy has, justly or unjustly, connected together as having a common origin: and a large catalogue of epidemics has been made out, compared with such cotemporary phenomena as I have alluded to, in order to prove the natural connection between them. After a patient examination of the facts detailed, I confess I cannot perceive that such connection is perfectly proved, at the same time that the idea of a *uniform* pestilential principle is at variance with the history of epidemics, which are almost infinitely *diversified* in their character at different times. The whole history of the origin, range, and termination of the epidemic bane, and of the variety of diseases that it occasions, seems to me to prove that it is very differently compounded at different times: indeed there is some variety in almost every important epidemic that is recorded. In short, I have been able to give no further account of its nature than what I offered in a former section, where I described it as under the influence of electricity, in some manner hitherto unexplored, acting in conjunction with innumerable forms of malaria, on persons whose *diversified* constitutions and preexisting disorders were capable, on the principle of combination, of rendering its effects almost innumerable.

What this epidemic principle is,—this *πν Θσιον* of antiquity,—cannot perhaps ever be demonstrated; but facts in natural history independent of pathology, clearly prove that its nature is very various, and, as it would seem, often comprehending very dissimilar specific stimuli; for in some pestilential seasons, when not only man, but domestic animals, and even birds and grasshoppers, grow languid, sicken, and die by thousands, other tribes of animals,

reptiles, and insects, suddenly appear and flourish in such vast numbers, as to give rise to the vulgar belief that they were generated spontaneously by the pestiferous air in which they seemed to revel. We have many recorded facts of a plague of flies and a murrain of beasts occurring together, the state of the air being at the same time the life of one and the bane of the other. Blights of animalculæ also afford another example of an atmosphere, or a wind, productive of diseases, being also the vehicle of animal life in another tribe of beings.

Various insects which visit us in particular seasons, occur in great numbers in some years, while in others they are equally rare. Wasps, at the close of summer, abounded for example in England in 1821 in prodigious numbers; the year before, they were in the ordinary quantity, and in the year after rather numerous, but last year there were almost no wasps. In 1826 and 1827 certain species of ladybird came about Midsummer over the southern parts of England in millions, wending their course southwards, they were found miles out at sea, and were at length drowned. I remember being at Brighton when the ladies used to change their shoes on getting home from their morning walks, to avoid the smell of the innumerable insects of this sort that were thickly strewed on the pavement; the smell of the whole genus *coccinella* being very powerful. These insects are said to have alighted in millions on the dome of St. Paul's church at London in their flight, so as to give it a reddish appearance. Similar facts will be found in the natural history of other insects. The cause of this casual prevalence is unknown: it has been attributed, and I think with considerable plausibility, to the particular times of year when frosts, rains, or other destructive phenomena have happened. For when these occurred at times of year favourable to the destruction of the eggs or larvæ of the insects, in these years the perfect insect would be developed in less numbers. Particular states of air and electricity may also favour particular genera of animals. Stagbeetles, cockchafers,

flies, and in short all insects, have their years of prevalence.

All these facts show the diversified nature of those atmospherical peculiarities whose casual occurrence produces such a variety of phenomena, both in the production of life of certain animals, and of disease in others ; and contradicts the notion of a general and uniform cause of epidemia.

Dr. Gall was of opinion that the evervarying seasons operated through the atmosphere in such a periodical manner, as to cause more male children and animals to be born in one year, and more females in another, as if there were some general causes for determining the sex that had alternate periods of predominance.

In the vegetable world similar phenomena are observed. In some years, for example, there is abundance of pears, in others of plums, of berries, and so on, other years afford melancholy instances of failure.

Famine not only precedes pestilence by augmenting the predisponent cause, but it also accompanies it as a concomitant effect of the exciting cause ; both the vegetable and animal kingdoms being in some cases injured together. In other years pestilence is accompanied by the luxuriant production of certain tribes of esculent plants.

All these facts, when added to what we know of the phenomena of epidemics, corroborates the opinion I have advanced that the atmospherical excitant is at different times infinitely diversified in its specific character. Of its various changes and revolutions we know little : we can only collect an imperfect knowledge of them from its recorded effects manifest in the dissimilar character and revolutions of prevalent disorders, of which history after all affords but an imperfect memorial.

That the ravages of any epidemic which appears, is incalculable, must appear evident ; because we do not know enough of its peculiar feature to say what number or sorts of victims it will select, since in airs, as in foods, what is one animal's meat is another animal's poison. All we can do is to exert our efforts to mitigate its effects, or to fortify the body against them.

As to the remote origin of the epidemic bane it is involved in the same veil of obscurity that overhangs atmospheric phenomena in general. The notion that comets and the particular position of planets have anything to do with it wants proof. The testimony of ages seems certainly to support the notion—but what Olandian said—that, *In coelo nunquam spectatum impune cometam*, though copied by numerous writers, has been badly made out. Accidental coincidences have at times favoured it: just as the aurora borealis, zodiacal lights, and other great meteors, have at times preceded wars, pestilence, and famine. Nevertheless I would by no means discourage enquiry even into this branch of the subject. The great Bacon was of the opinion above alluded to, and a too hasty condemnation of it on the one hand would be as improper as a hasty adoption of it on the other. Our catalogues of epidemics, and of the phenomena that accompanied them, will at all events be interesting subjects of perusal. The changes of the moon too, and their connection with the monthly and daily exacerbation of disease are worthy notice; for diseases which seem doomed to run through a certain term, are often made worse by the untimely employment of the same remedies which, if given after the symptoms had passed the period of their greatest exacerbation, would have become highly useful in hastening the cure. I think it right to mention here, that I was for a long time unaware of this fact till it was suggested in my mind by some very recent observations on cathartics. Formerly, observing the general utility of mercury, I recommended it in some cases, at an untimely stage of the disorder, and I have been surprised to find it did not take effect till after a certain periodical crisis, which the complaint passed.

Even diseases of the brain which may be brought on by accidental causes, as melancholy which supervenes on continued or violent agitation and anxiety of mind; fevers, delirium, and other complaints, evidently originating in violence done to the brain by moral and physical causes, as

passions, miasmata, and pestilence, acquire in many cases a certain periodicity, have a natural term of duration, are influenced by subsequent changes of the atmosphere, and are exacerbated at the monthly periods. I do not however find the monthly periods to be perceived by the most healthy people; nor are they, in any opinion, quite so regular as the moon in the times of their occurrence, being dependant on electrical changes which fluctuate in their exact distance from the periods of the lunar changes.

Of the mode of this periodical action of the atmosphere's origin from the moon, or from some other unknown cause, I will say nothing at present, since hypothetical opinions only bewilder the philosophical arrangement of facts at the beginning of inquiry. A few facts, however, may be here adverted to, which I have omitted when I was treating of lunar influence. If a division of the lunar month be made into four weeks, in the middle of each of which one of the four changes of the moon shall take place, then it will be found that what I call the lunar periods of irritability will occur in those weeks in which the new and full moons fall, and not in those of the quadratures. And what shows, as much as any thing else, that electricity is the medium through which this influence is exerted on our planet, by its satellite, is, that earthquakes, volcanic eruptions, meteors, waterspouts, gales of wind, violent storms, and other known effects of the electric fluid, have been proved, by extensive enquiries that I have made, to have usually happened at those periods near to the conjunction or to the opposition of the moon.

The rustic sacrifices which the country nymphs of antiquity used to make to the young crescent moon, to which Horace alludes in Ode 23 of lib. iii, in order to avert pestilential winds, had probably a reference to the lunar influences which I have described above.

CHAPTER IV.

ENQUIRY INTO THE NATURE OF THE PREDISPONENT CAUSES OF DISORDERS, AND OF THE POWER OVER THEM TO BE OBTAINED BY MEANS OF TEMPERANCE AND SIMPLE MEDICINES.

AFTER the foregoing enquiries into the nature of the specific atmospherical excitant, the predisponent cause of disorders of health next seems to claim our attention. I have alluded to the latter frequently in the discussion of the former cause, in a cursory manner, nevertheless it seems to demand some further attention, owing to its being more under the controul of medicine.

When an epidemic appears in a particular tract of country, except in cases of some violent and determinate pestilence, it may be observed that only certain persons are affected, while others escape; and, moreover, the same persons who were disordered one time, will escape during the visitation of the same epidemic at another. Though all this may be in part occasioned by the peculiar susceptibility of individuals to specific stimuli; yet it appears to me that it more often is the result of general causes belonging to the constitutions and habits of life of the individuals, which predispose them to the attacks of epidemics. As I have before observed, plethora, combined with weakness, is the grand predisponent to diseases. On the other hand, those who have lived temperately, whose vessels have not been overloaded with blood, and whose susceptibility to the natural stimulus of food has not been overstrained by excess, are the class of persons who are in general the most secure against the attacks of disease. They are the persons who, *cæteris paribus*, possess the largest share of what I have in another place called the reserved and available strength of an unimpaired constitution. I called it reserved strength,

because it seems, as it were, laid by for any occasion of emergency. For example, a person who habitually lives abstemiously, and has not suffered his susceptibility to natural stimulus to be diminished by food, strong drinks, and the wear and tear of the passions, can, when necessity requires a little more animal action, easily call it forth by a small addition to the usual quantity of his food and stimulus: whereas one who is wound up to a high pitch of living, and is habitually above par, is incapable of any further excitement of his animal powers, whatever circumstance may occur that should require it; and, consequently, when attacked by the morbid excitement of an epidemic, he has no resource in the counteracting power of an encreased natural stimulus, and generally sinks under the morbid influence. Such cases afford us a melancholy spectacle of an overfed and ruined constitution breaking on the rack of death in proportion as the several debilitated and irritated organs follow each other to decay.

On a similar principle, we may explain why veteran troops, long used to hardships and want, can cope with the fatigue of campaigns, better than recruits; and why countries, long the theatre of war and its necessities, suffer less, from battles, than those over whom Peace has long shed her blessings from the horn of plenty.

When an epidemic arrives, the florid and full habits of those who are well fed and comfortably housed, may perhaps the longer *avoid* the incursion of the atmospherical excitement, while the badly fed and more exposed, run the readier *risk* of infection; but when the epidemic has fairly set in, and pestilence prevails, the abstemious are always those who weather the storm.

A circumstance may be mentioned here, which from being misunderstood seems calculated to give support to the dangerous medical practice of the present day, which too often encourages overfeeding, and forbids the requisite periods of abstinence. When certain epidemics occur, as for example those of a low and intermittent character, the poor

who are badly nourished suffer in greater numbers than the rich who live better. This is a fact of general observation, and two causes may be assigned for it: one is that the low living of the indigent and working classes consists often in cheap food of bad quality, as pork, spoiled meat, and so on, and they have often neglected, from want of ready assistance, to regulate their stomach and bowels by medicines, when out of order; and hence has arisen a state of the digestive organs, which being the cause of nervous weakness and general debility is necessarily favourable to the visitation of disease. This state of body is indicated by long continued costiveness, and by the black and fetid excrements which, I have observed, the first exhibition of purgatives produces. Such states of body are contrasted to those of their affluent neighbours, who maintain, for the time being, a greater power of constitution derived from a supply of *better food*.

The state of constitution which I would recommend as conducive to health, and which resists the morbid stimulus of epidemia, is not exactly a medium between the two above described extremes; but is a condition of body wherein a regular but moderate supply of food of a nutritive, but unstimulating nature, increased in power by periodical abstinence, has kept up, in the animal system, the due proportion of strength, without exhausting the susceptibility.

But even the poor, who are badly fed and whose bowels are neglected, though they oftener get low fevers and agues than the affluent and luxurious, yet when the latter do incur those complaints, they are less tractable: of which fact I have just been perusing the detail of some curious instances that occurred in the practice of an eminent physician at Bath.

Persons trained for great athletic exploits, begin their training on a good principle, for temporary purposes: they withdraw the exhausting stimuli of spirituous drinks, and feed regularly on meats that throw a large quantity of nourishment into the system in proportion to their bulk. But this state of animal strength, however capable of rendering

them for the time *validi ad impetum*, cannot nevertheless be long maintained, being above *pur*, and resulting from an excitement incommensurate to the powers of the constitution: they are, in consequence, not only shortlived but soon become less capable of resisting the exciting causes of pestilence than others who habitually live on a more moderate supply. Wounds too, though borne pretty well at first, while the high animal strength is maintained, never fail, if they occur when the body has once turned the scale and begins to decline, to produce unnatural consequences, and many that ought to heal by first intention, suppurate badly and end in intractable ulcers.

It is from a similar cause that armies, during the energy exerted in a campaign, remain for a time healthy; but when the battle-blast is over and Fury has swept the plain, when the excitement has subsided and fatigue supervened, then if Fever be abroad, she presses with fell weight on the exhausted legions, whom famine contributes to debilitate, and hence it has usually happened in countries much subject to epidemics, that pestilence has always played a leading part in the tragedy that follows warfare.

Another fact ought to be duly considered and described, while we are still in parley with *Meditrina* in the camp, namely, that though soldiers, whose good angel may conduct them to a more plentiful supply of provisions after a harrassing guerilla, may come off better with the prevailing fever than others who suffer from inanition, yet in whichever fortune their lot is cast, those will have the advantage who have *previously* and habitually lived temperately; for they will not only have less change to undergo, when forced to put up with a scanty morsel; but will have a purer state of body, and a less exhausted excitability, to enable them to cope with the deficiency. Conformably with this view of the subject, we find that the more austere fasts of our religious ancestors were prepared for, by abstinences of less severity, and were submitted to, not only with safety, but with benefit; while the luxurious are for ever making frivolous excuses,

and complaining that they cannot bear the slightest deviation from the order and quantity of their meals. Temperance is at all times a strong siding champion against the incursion of disease ; but its tutelary patronage is never more satisfactorily felt than when untoward Fortune obliges us to grapple with the meagre hand of want.

I spoke just now of wounds, and this reminds me of a circumstance that once happened to myself, which strongly impressed me with the utility of temperance.

Being during the early part of life indefatigable in my dissections in comparative anatomy, to pursue which I sat up at night, while my necessary studies took me to the hospital in the day, I found my health declining ; and in conformity with a sort of fashion among some distinguished men at St. Bartholomew's, I determined to live on vegetable food. I remember my friend, Mr. during the habits of protracted study which he was accustomed to follow, did the same, and I thought with advantage to his health. An entire family, comprehending a large number of the finest children I ever saw, observed more strictly a similar vegetable regimen, and I found that others who followed it, were some of the most healthy and intellectual of my acquaintance, among whom were Shelley, Byron, and Lamb, and other mathematicians and scholars, high in the Cambridge tripos, whose energies sprung from no source of nutriment, but the simple *cibo di latte e frutto*, so celebrated by the Italian poet. I determined, from viewing the restoration of broken health in some of my friends, to try the experiment on a complete scale, and I lived during three whole years on the products of the vegetable kingdom, and I was never stronger or more healthy in my life than at this time. It happened towards the close of the period that I am alluding to, that the *extensor indicis* of my left hand was cut by a splintered wound, and the periosteum below it severely injured : indeed so bad was the place, that when I had got out the fragments left in the wound, a surgeon told me I should never have

the use of the fore finger again, and probably never that of the hand. I disregarded what was said, knowing of what severe wounds the Indians, particularly the Lascars, recover who feed on rice and herbs. I went to the seaside, doctored my own hand, and still further reduced the quantity of my food, eating chiefly of ripe fruits. Suffice it to say that, contrary to all expectation, the wound healed almost by first intention, and an adventitious substance being interposed between the divided ends of the tendon, I had every thing but power of motion in the finger; and for this I found an expedient, for by tying for a while the index and middle finger together, the repeated voluntary attempts to move the finger were not wholly successful, and I believe that the perfect use of it, which at length supervened, was acquired by the muscles gaining by degrees a larger sphere of contraction, adapted to the new circumstances of an elongated tendon, agreeable to Mr. Hunter's notions of such a provision existing in the animal economy, wherever successful volition could be superinduced in muscular parts. I mention this piece of surgical history, to show what powers of restoration are comprehended in the tranquillizing effect of abstemiousness in the animal machine.

I do not intend by any means, in what I have said above, to recommend to people in general, a diet of vegetables alone; on the contrary, experience has proved that a mixed regimen of animal and vegetable food is best adapted to the human stomach, but in illustrating the nature of the general predisponent causes of disease, it seemed advisable to select some marked cases of the power of abstemious diet to remove them. The good things of life were certainly given to be temperately enjoyed: moderation and regularity constitute the great panacea of health, and if with any description of food we may revel in luxury, it is surely in the delicious gifts of Pomona that the palate may be allowed to indulge, where a little deviation from temperance may be permitted with comparative security.

I have thus explained my view of the general predis-

posing causes of disorder, as well as of the source of its excitement: of the means of removing the former by simple medicinal and dietetic means, perhaps the best illustration is to be found in a work on the constitutional origin and treatment of local diseases, by Mr. Abernethy. He has been the great modern reformer of medicine, and while learned doctors have disgraced their plumes, and wasted their time in empiricism, or what is worse, in silly disputes about privilege, and the nature of the religious oaths, that it were necessary for candidates for office to take, this gentleman, by profession a surgeon, has been reading to them, and to the medical public at large, instructive lessons on the curative power of the *medicina simplex*, and teaching them to retrace their steps and return, from the complex artifices of the modern trade of physic, to the simple practice of Hippocrates and Galen, whose study of medicine was the observance of Nature, and whose practise was her assistance and aid.

Mr. Abernethy and I have differed materially in opinion on some points connected with Mr. Hunter's Theory of Life, and certain supposititious corollaries; but in all matters relating to physic, his opinion stands high in authority; and I feel a satisfaction in this opportunity of acknowledging the advantage in early life that I derived from his instructions on this subject, to which, rather than to any discoveries of my own, I have been subsequently indebted for my success in practice.

§ 2.—Of hereditary Predisposition to Disease.

Among the most important of the predisponent causes of diseases in their various forms, may be reckoned innate hereditary varieties of constitution. No structure so complicated as the animal machine can be supposed so perfect in the adaptation and relative strength of all its parts, as to preclude the occurrence of comparative weakness in particular organs. When exciting morbid causes begin to operate on the body, as atmospherical irritants for instance,

those parts will suffer most which are the weakest ; and thus it happens that even epidemics of certain sorts recur with a remarkable similitude in the lineal branches of the same family, in consequence as it would seem of hereditary defects of constitution.

This tendency of diseases, which occur in any individual, to recur in his posterity, seems therefore to be an effect, comprehended among the general consequences of that apparent law, in the animal economy, which confers on procreation, the power of transferring the peculiar features of the parent to the offspring.

A few instances may be mentioned. In gout, the predisposition existing permanently, the paroxysms are produced by the external and often periodical exciting causes. The same may be said of consumption, scrofula, and other constitutional diseases. Even in the cases of cancer and other more fixed and local disorders, I have generally been able, by enquiry, to discover that the same disease had existed before, in some branch of the family. And I believe that generally speaking, however modified diseases may be by the influence of predisponents, and still further by the specific and peculiar nature of the excitant, hereditary predisposition is a very general cause of the characteristic symptoms of them in different families, in races, and in nations.

§ 3.—*Enquiry how far the particular Form of the Brain determines the predisponent Cause of Disorders.*

A question of great interest to the physiologist arises as to the degree and manner in which the forms of the brain constitute the predisposing causes of disorder. For it seems that persons, who have particular cerebral organs much developed, are more liable to particular forms of disease than others, whenever the exciting causes happen to occur. I am so well convinced of this fact, from repeated observations, that I should hardly consider the predisponent

causes could ever be well understood, by those who had not some knowledge of the original varieties in the structure of the brain. I cannot enter here into the complete investigation of these varieties in the relative proportion of the cerebral parts, which constitute the science of phrenology, as it would require more room than there is to spare in these sheets,* but, without committing my opinion as to the truth of the whole system of phrenology, I would remind the anatomical reader, that the preponderance of particular parts of the brain will naturally give, to the characters of the individuals, a bias corresponding to the nature of the powers and propensities of the mind, of which such parts are the respective organs. When the front lobes are much developed and the forehead large, we usually find a corresponding capacity of mind. When the lower and lateral parts are large, we find the propensities more powerful, and so on. I state this merely as an example.

With respect to disease, one thing has always been to me very striking, namely, the tendency which an enlargement of the lateral and upper parts of the posterior lobes has, to predispose to melancholy. While large temples and the great size of parts immediately above and behind them, predispose to ideality and a romantic or poetical disposition. Persons with that part of the brain, rather above and behind what phrenologists call the organ of ideality, which I, in my essay on the brain, called the organ of mysteryingness, are particularly subject, when they incur ill health, to those remarkable illusions which I have already described, and of which the celebrated Nicolai was so much the sport. In fine, a very extensive enquiry into this subject, of which the details are too long for insertion, has convinced me that the forms of the brain, either determine the nature of the

* I may refer the reader to the works of Dr. Gall and Dr. Spurzheim, which are now to be found in French, in German, and in English; likewise to the various publications of the Edinburgh and London Phrenological Societies; and to a small Treatise on the Anatomy and Physiology of the Brain, which I published in 1816, by the title of the *Phrenological System*.

most essential hereditary predispositions to disease, or what, by the by, is more probable, that both the forms of the brain and the predisposition to which they give birth, depend on varieties of character inherent in the sentient principle itself to which we give the name of mind. For it is the capacity for sensation, which really constitutes what is called self or personal identity, of which the bodily organs, which compose each animal machine, are only the medium through which the individual mind is placed in relation to the external world.* The matter then of the animal fabric constitutes the Body, of which the particles are in themselves inert; their vital motion, of which we know not the proximate cause, is called the Life, while the inherent capacity for sensation is the Mind. When we speak of the latter with respect to its perpetuity in a future state, we call it the Soul; of which all that is known belongs so exclusively to the sacred storehouse of religion as matter of faith, that there would have been no apology for introducing it into a work of physiology, except the necessity of defining terms and of pointing out the links in the chain, whereby the mind of man is active in the production of organs, and, through the agency of organs, capable of becoming a powerful predisposing cause of disease, according to the varieties of its individual character. To this subject the attention of the physician must be always directed in every case in which the disorder he is treating partakes of the character of what is called a nervous complaint.

There are many facts which show the close connection between the manifested powers of the mind, and the state of its organs, though they do not in any manner serve to identify the mind itself with those organs. The recollected images of childhood, when more recent events are forgotten,

* The writings of Tertullian, of St. Augustine, and of several of the ancient Fathers of our Holy Catholic Church, contain some fine passages on this subject: the perusal of their works convince me how much their knowledge exceeded that of modern philosophers, even on the subject of physiology and metaphysics.

the stupifying effects of concussion of the brain, the loss of particular faculties, and the evervarying state of the spirits which keep pace with the bodily health, all show the close connection to which I allude.

I remember several years ago the case of a man who fell from the boom of a vessel on the deck, and hurt his head, who for many hours during the course of his recovery, could only speak of childish recollections, and of those only in Welch, the vernacular language of his infancy; but whose English returned slowly with his more advanced convalescence.

The above authentic story seems to throw some light on the cause why old people forget recent, while they remember antient events. For in both cases, injury done to organs, either by accident as in the one case, or by decay as in the other, had rubbed out the slighter impressions made on the sensorium of manhood, but had left untouched the forcible imagery inscribed on the yielding mould of youthful memory, at an age, in which life seemed, to the novitiate in the community of existence, like a boundless horizon, from which, as years advanced, new and exciting objects of investigation arose, like glittering constellations, for a time, in endless succession, and left impressions, powerful from their novelty, which time could never efface.

CHAPTER V.

HISTORICAL NOTICES OF SOME REMARKABLE EPIDEMICS CONSIDERED AS THE GRAND SCOURGES OF MANKIND, TENDING TO SHOW THEIR ATMOSPHERICAL ORIGIN, AND CONFIRMING THE DOCTRINE ALREADY LAID DOWN.

WHEN we consider the devastating nature of that class of disorders to which this essay relates, and the terrible effect with which they have at times visited almost every country, and in every age of the world; it will be impossible not to see that they must have had a large share in the work of depopulating the many once flourishing cities and states, which have now gone to decay and are almost forgotten. I have already shown the natural connection between pestilence and those moral causes which have contributed to overthrow, in succession, the most powerful antient empires; but I am persuaded, from historical researches that I have made, and from facts thereby collected, that the influence of epidemia, as a depopulating agent, has not been duly appreciated by those who have written on the fluctuations of human prosperity and civilization. The philosophical historian, contemplating these eventful changes, who views cities brightening into eminence and again waning and coming to nothing, like changeable stars glittering in the telescope of time, must be struck with the necessity of inferring the operation of some very powerful causes, in order to account for vicissitudes so remarkable. Well may he exclaim—where now is the magnificence of Persepolis, the sevenfold strength of Ecbatana, the grandeur, power, and science of the mighty Babylon, by whose waters the most powerful of nations wept in captivity? Where are now the temples, the aqueducts, and the busy population of Palmyra, the opulence of Thapsacus and of Anathoth, the fleet of the Phrygians, and the commerce of Tyre and

Sidon? And where is Nineveh, whose name is the only remains of her greatness, and over whose site the plaintive Muse may tread in mournful silence to sing her dirge! Is the stream of vitality necessarily a fluctuating torrent, whose tides ascend now on the lofty billows of prosperity, now subside in the shallows of poverty, or are lost in the whirlpool of revolution? Is there any irresistible law by which the light of Science, which first dawned on the Nile, and created Thebes the prototype of cities—which descended westward to Cairo, to Memphis, to Gaza, to Jerusalem, and to Athens,—which made Rome the mistress of nations, and at length transferred her seat to London and to Paris, should necessarily wend a meteor course, and leave desolation in her train? For if this be the destiny of greatness,—if Fortune thus lead Pallas by the hand, by any inevitable law, places now the most civilized may, ere long, be barbarous and ruined; and since Liberty has crossed the Atlantic, and established her empire in a land of freedom, so favourable to rising talents, she may soon concentrate her powers of civilization in America! To the philosopher thus speculating on the undulations of prosperity, we might point out, in the mysterious and eventful visits of epidemia, one of the principal evils that have depopulated states. For we shall find that in addition to the destruction of the sword, famine and pestilence have had a large share in bringing once flourishing cities and powerful kingdoms below their natural level in the scale of nations, from which they cannot easily emerge.

That I may not be accused of overrating this cause, I shall proceed to relate a few cases from history. Previously, however, to going into the detail of this subject, I may observe that I by no means intend to attribute to epidemics all the momentous fluctuations of civil and commercial prosperity, of which history affords us so striking a picture, but to insist on the fact that as epidemia constitutes the most important sources of morbid excitement, and attacks those whose constitutions, the sufferings of warfare, want, famine,

and casualty, have weakened and rendered irritable; so it must be regarded as one of the principal adjutant causes which have helped to destroy civilization in particular places. There may be, no doubt, great periodical causes for the fluctuation of human excellence, in different parts of the world, of which no philosophy has yet reached the extent, nor measured the periods. The northern Africans, who once taught learning to the world, are now a comparatively enfeebled race, and countries, once the seat of the arts of life, present nothing but the monumental lesson of a huge ruined exterior, and a debased population, dwelling almost in huts, among the mouldering fragments of the skill and greatness of their ancestors. Though we know little of these general causes; the moral causes are insufficient to account for the change, without taking into account the powerful cooperation of the physical; and as atmospherical pestilence, including epidemics, epizootic, and famine, have ever been the great scourge of mankind, so to it we must ascribe, in a great measure, those important vicissitudes in the lot of mortality, of which history presents to us such a melancholy spectacle.

In proceeding to give some remarkable instances of the destructive effects of epidemics, in proof of what has been advanced, I shall request the reader, as he goes along, to apply the doctrine of chances to the argument in such a manner as to strengthen the proofs; and to reflect that for every thousand persons whom history has actually recorded as being swept off by epidemic pestilence, we may almost infer the probability of a million dying unheeded by the historian, and unknown to posterity.

§ 2.—*Historical Catalogue of Epidemics.*

It is not my object in this sketch to enumerate all the more trifling epidemics, and the disorders of particular seasons that are recorded, but only such general and important pestilences as have made a considerable havoc.

among mankind. Among the antient writings of the Jews, which are perhaps the earliest we are acquainted with; we find pestilence mentioned as the greatest human evil, and represented as the occasional scourge of mankind. It is particularly noticed in the fifth chapter of Exodus, nor has there been any age since, in which instances of epidemics of the more terrible kind have not been recorded. What is remarkable is, that pestilence is usually connected with famine, and it is probable that this is partly owing to their both being caused by the same pestilential constitution of the air, as well as by the fact that famine aids, as I have elsewhere proved, the devastating effects of epidemics.

Another remarkable fact ought also to be particularly noticed, namely, that the plagues of flies, and periods of darkness in the air, mostly preceded or followed that which consisted of morbid symptoms in men and animals; this circumstance, of which we have many examples, is particularly worthy of notice, in relation to what I have advanced on the subject in the third chapter.

The emerods, mentioned by Samuel, were a sort of plague, and seem to have been, even in those days, considered quite different from the endemical pestilence which belonged to certain districts in Egypt, with which however it appears the Jewish writers sometimes confounded the occasional visitations of the two epidemical plagues with which they were afflicted at uncertain periods, and which they imagined came from Egypt. The murrain of the cattle too is mentioned frequently in the Bible.

Homer in his book of the Iliad, sings of pestilence in a very remarkable passage, wherein he describes it as the arrows of Apollo, first fixing on mules and dogs, and then on men.

Οὐρανὸς μὲν πρῶτον ἐπώκετο καὶ κύνες ἀργούς

Αὐτὰρ εἶπετ' αὐτοῖσι βέλους ἐχέπαικες ἀφίεις.

The learned commentator on this passage in the edition of Homer, printed at the office of the Caldorian Society, quotes Hippocrates and other learned authors, to prove that

dogs and other animals that have finer noses than men, sooner catch the flying stimuli of pestilence.

In the fifth book Homer ascribes plagues to hot south winds, when of long continuance, a fact also asserted by Hippocrates. Mr. Pope, in translating another passage in book 19, relating to pestilence, has made Homer ascribe it to comets, which is not in the original Greek.

Like the red star that from his flaming hair,
Shakes down disease, and pestilence, and war.

Pope has evidently taken this poetic licence with Homer, with Milton's lines in his head, in *Paradise Lost* :—

————— And like the comet burns
In the arctic sky, and from his horrid hair
Shakes pestilence and war.

Homer in the 22d book of the *Iliad*, at the 30th verse introduces, in a description of Achilles, an allusion to the pestilential influence of the star called Orion's dog.

Φαίνηται πολλοῖσι μετ' ἄστρασι νυχλὸς ἀμολγῶν
Ὅν δὲ κυῶν Ὠρίωνος ἐπικλήσει κάλεισσι.
Λαμπροτάτος μὲν οὐδ' ἔστί, κακὸν δὲ τὸ σημεῖα τέτυκται,
Καὶ τὲ φέρει πολλὸν πυρέτον δειλοῖσι βροτοῖσιν.

In another place Homer alludes to the long period of pestilence which began during the siege of Troy, and which was followed by a tremendous eruption of mount Aetna.

Virgil describes the effects of the eruption of Aetna when flying, by sea, from Troy to Sicily. If I recollect right the glowing description of this eruption of Aetna ends thus—

Interdumque atram prorumpit ad aethera nubem
Turbino fumantem picea et cadente favilla,
Attollitque globos flammarum et sidera lambit.

The pestilence from Troy at length reached Sicily, and Dionysius Hallicarnassensis has described, in his first book, its destructive influence on the early Pelasgi who first settled in that island.

But before this event, many years, the island of Aegina had been depopulated by an epidemic, which, if we only credit the history given of it by Ovid, in *Met.* vii. 540,

was a remarkable exemplification of the atmospherical cause of pestilence: it began with a long continued south wind, an air full of dark vapours and electric phenomena, the great abundance of serpents followed, and a disease which destroyed birds, dogs, and other domestic animals, and lastly human beings by thousands. The author has described the symptoms very accurately, as following the state of the air.

Principio coelum spissa caligine terras

Pressit, et ignavos inclusit nubibus aestus.

The plague, he says, first began with birds and cattle, and then attacked man, as is frequently the case.

Strage canum prima, volucrumque oviumque boumque

Inque feris subiti deprensa potentia morbi.

Concidere infelix validos miratur arator

Inter opus tauros, medioque recumbere sulco.

Lanigeris gregibus balatus dantibus ægros

Sponte sua lapæque cadunt, et corpora tabent.

Acer equus quondam, magnæque in pulvere facit,

Degenerat palmas: veterumque oblitus honorum.

Ad præsepe gemit, morbo moriturus inert.

Non aper irasci meminit; non fidere cursu

Cerva; nec armentis incurrere fortibus ursi.

Omnia languor habet: Silvæque, agrisque vilisque

Corpora foeda jacent. Vitiantur odoribus auræ.

Mira loquor. Non illa canes, avidæque volneres,

Non cani tetigere lupi: dilapsa liquescunt,

Affatu; nocent; & agunt contagia late.

Pervenit ad miseros damno graviore colonos

Pestis, et in magna dominatur mœnibus urbis.

Viscera torrentur primò; flammæque latentis

Indicium rubor est, & ductus anhelitus ægre.

Aspera lingua tumet, trépидisque arentia venis

Orâ patent; auræque graves captantur hiatu.

Non stratum, non ulla pati velamina possunt;

Dura sed in terra ponunt præcordia: nec fit

Corpus humo gelidum, sed humus de corpore fervet.

Nec moderator adest: inque ipsos sæva medentes

Erumpit clades; obsuntque auctoribus artes.

Quo propior quisque est, servitque fidelius ægro,

In partem levi citius venit. Utque salutis

Spes abiit, finemque vident in funere morbi;

Indulgent animis: & nulla, quib. utile, cura est:

Utile enim nihil est. Passim, positoque pudore,

Fontibus, & fluviis, puteisque capacibus hærent:

Nec prius est extincta sitis, quam vita, bibendo.

Plutarch, in his life of Romulus, somewhere tells us that seventeen years after the foundation of Rome, a dreadful pestilence suddenly seized on the people, and death was so rapid, that sometimes there was only a few hours sickness. The malignity of this epidemic extended to cattle, birds, and even to trees and plants, and eventually ended in famine.

Zonaras called this pestilence of Rome *sterilitas agrorum et pecundum*, from the same conjunction of diseases of animal and vegetable life. It ought to be observed here, that Rome was then small and thinly peopled, luxury had made but little way then, and the constitutional predisponents to disease being few, the greater must have been the force of the atmospherical excitant. A more extensive though less violent pestilence destroyed parts of Italy in the reign of Numa Pompilius, anno. Rome 46. The Salii or dancers with the brazen target was constituted at this time.*

Another plague thinned Rome in the time of Tullus Hostilius, 110th year of the city. About a hundred and fifty years afterwards an epidemic nearly depopulated the city of Velitrae, when the Holci actually applied to the Romans for people to stock their territory again after the havoc that had been made of them.†

The plague of Rome of the year anno. R. 281, described by Dionysius Hallicarnassensis, came on quite suddenly, was very limited, and as suddenly disappeared, like the plague of Athens, described by Thucydides. Some modern plagues have been equally rapid in their course.

There are some circumstances concerning the plague which followed the battle of Salamis worth noticing. A comet, and a violent eruption of Aetna preceded it; and it led to an enquiry, which indeed was the general belief, whether comets rouse the fire of volcanoes, and also bring violent heats and pestilence in their train. The pestilence alluded to carried off most of the remaining army of Xerxes after that said battle.

* Plutarch's Life of Numa

† Maratori, vol. 1. 5.

Greece has at all times been less subject to epidemics than Italy, owing, as it would seem, to her more dry air and rocky soil, affording an atmosphere less capable of becoming the vehicle of sudden electrical effects, and a surface from which unhealthy miasmata were less capable of being exhaled: nevertheless when Greece has been visited by pestilence it has been often very violent. Rome has been remarkable for its numerous epidemics, and it was in one of them that St. Aloysius perished in the flower of his youth, in the year of our Lord 1581, early in the morning of the 21st of June. The Campagna di Rome still continues the frequent seat of terrible influenzas and fevers particularly towards the close of summer. The following lines, said to be preserved by Baronius, show the almost proverbial unhealthiness of Rome in ancient times.

Roma vorax hominum, domet ardua colla virorum;

Roma ferax februm necis est uberrimia frugum.

The famous lake Avernus, in Campania, was so unhealthy in its vapours that even birds avoided its banks, and the ancients from its pestilence feigned it to be the way to hell. It was the state of the air in Rome so ill adapted for carrying off odours that gave rise to the cloaci or great sewers, and to the goddess Cloacina. The pestilence in anno U. C. 290 killed the consuls Servilius and Albus and produced the most dreadful ravages among the people; and two years afterwards the earthquake happened, which cut off Locris from the gulph of Corinth. For a long period after this Rome was scourged by such frequent epidemics, that she was called by Livy, *urbs assidue exhausta funeribus*. To enumerate all these plagues would be too great a labour in this work; some of the pestilential seasons returned successively for years together, but at other times there remained one continued source of depopulation for an equally protracted period. I have recently examined all the authentic histories of these epidemics that I could collect, and I find that excessive heat, long drought, unseasonable rains, earthquakes, meteors, volcanic eruptions, and other

effects, ascribable to the various actions of electricity, generally preceded or attended them. A similar remark may be made on the desolating plague which happened at Athens, in the second year of the Peloponnesian war; its symptoms have been described by Thucydides. During the continuance of this dreadful plague Hippocrates was at Thasus, an island off Macedonia, and he relates that the pestilential constitution of the air was of vast extent and duration. He speaks of the four epidemic years as those of peculiar unhealthiness. But the origin of the specific excitant of pestilence is no where more clearly shown in ancient history, than in the accounts which Plutarch, Livy, and Zosimus, have left of the plague of Rome, U. C. 353. The winter had been monstrously severe, the Tiber was frozen, and a heavy snow clogged up the roads. A sudden accession of electricity and heat on the melting of the ice, and a hot succeeding summer, produced an epidemic of prodigious virulence which carried off the people by wholesale. The Sibilline oracles were consulted on this occasion, and towards the close of the pestilential season the festival of the Lectisternia was instituted to appease the power of heaven.* The plague was soon extended to Carthage, and we find the circumjacent states suffering in a lesser degree, from being as it were under the outskirts of the pestilence.

The same historian relates that a tremendous plague broke out at the siege of Syracuse, by Marcellus in U. C. 541, and he observes here that the state of the hot air of the season caused it, but that it afterwards became infectious. There was an eruption of Aetna this year; and Rome also suffered from an epidemic. In the 41st book Livy describes a terrific pestilence having occurred at Rome, in 577, in which the vultures would not touch the dead carcasses

* Livy v. 13, and sequel. The Lectisternium, which ceremony became annual on the Ides of November, consisted in laying the statues of Neptune, Apollo, Latona, Hercules, and Mercury on beds, and serving them with entables as if feeding the sick with luxuries. Another ceremony on the Ides of September, was that of driving a nail into the walls of the temple of Jupiter.

but fled from the precincts of Rome. The seventh day was critical in this plague. In 580 the Pontine marshes were devastated by a plague of locusts, which in the following year desolated Apulia. In 609 a comet is recorded to have been seen at Rome, and in 610 a desperate plague again assailed that city.

In the 12th book is a most vivid description of a pestilence that began among cattle in U. C. 576 which soon extended to men. Febris now seemed to trample every thing before her, even bulls, dogs, and all sorts of domestic animals; the highways were strewed with dead carcases so offensive that the vultures left them untouched to decay, and Libitina being overdone with her unwonted labours, and unequal to her office, the air, itself in a state of pestilence already, was still further loaded with the stench of disorganizing mortality. Numerous birds left the suburbs of Rome, during this plague, as they had formerly done those of Athens. This desertion of places, infested with the more violent forms of pestilence, which is a fact well known, in natural history, is worthy of particular notice, as it shows that the whole air is infected, and disproves the silly notion that pestilence owes its spread to contagion. To which we may add, that the vaporized atmosphere prevalent during the time of plagues often, by its peculiar refracting properties, produces those crowns of light, parhelia, and luminous arches, described by historians as signs of destruction. The bow seen to cross the temple of Saturn in the time of the above plague was probably one of this sort. Thirty or forty similar instances are on record of plagues that have happened in Italy, in Egypt, and in Asia Minor, which have been accompanied by extraordinary lights in the sky, and which have ravaged the earth and inhabitants to such a degree as to leave no doubt on the mind of any reasonable man that they must have been powerful agents in the work of desolation and ruin, to which I have already made allusion.

The swarms of flies, and at other times of locusts during pestilence, is a fact of importance, when viewed with

reference to the observations that I made in a former chapter. The darkness so often mentioned is another fact calculated likewise to show the atmospherical origin of epidemics. I must pass over numerous plagues recorded by Livy, Justin, and Pliny, to the consideration of a curious fact respecting the death of Julius Cæsar, in B. C. 44. A pestilential period was then beginning to prevail, and it was preceded by a set of natural events such as have been shown to have so frequently been the forerunner of disease, but which superstition, aided by an accidental coincidence, represented as signs of the death of Cæsar, as Virgil says, when *Sol etiam extincto miseratus Cæsare Romam, cum caput obscurâ nitidum ferrugine texit*, or as Ovid more aptly has it, *Phæbi quoque tristis imago Lurida sollicitis probabat luminu terris*.* At the same time we are told *Nec diræ toties arsere cometæ*. The comet of this period is said to have been the same according to calculation, which had appeared in B. C. 1767, when it would correspond to the deluge in the time of Ogyges, which inundated Africa, and when the planet Venus is said, on the authority of Varro and Pausanius, to have changed her figure, her colour, and her orbit, as if violently disturbed by this comet. It is said to have appeared again in B. C. 1194, when Electra left her sister Pleiades in the zodiac, and flew to the pole. According to writers its third period corresponded to B. C. 619, where it is recorded as the blazing star of the Sybil, and it appeared again always accompanied by terrible electric commotions and by pestilence in A. D. 531, 1106, and 1680 when it was seen by Sir Isaac Newton. I will here remark generally, for the details of the historical facts which I have examined, would be too long for insertion, that the following has expressly been the order of phenomena, during the last seventeen centuries. A comet has appeared, northern lights, meteors, and other atmospheric commotions have accompanied it, an unhealthy period of general occurrence, but prevailing most in particular regions, has followed,

* Virg. Geop. i. 466, and Ovid Met. xv. 786.

planned in a sort of regular order by the successive occurrence of influenzas and other slighter epidemics, the fevers of various kind, and lastly plague;* the circumference of whose central malignity has been marked by lesser forms of disorder, which latter have also followed as consecutive symptoms on the gradual subsidence of the pestilence as a healthy season returned. Animals too have suffered, and also plants during the epidemical period. Authors are said to have written some good historical notices of this and other effects of comets,† which analogy would lead us, if universally true, to ascribe to the interventional agency of electricity.

The paleness of the sun recorded so often as a sign of pestilence, must be an effect of vapour,—the Python of pestilence overcome by Delius Apollo; and a product perhaps of that sort of miasmata through which the morbid electrical effects might take effect.

A curious paper on the change of colour of the planets and stars was some years ago published by Mr. Barker, in *Phil. Trans.*, but on examination of the promiscuous use made by the antients of names for colour, I proved that his data founded on thier descriptions were inconclusive.

Still the remarkable paleness of the sun, and his blue, yellow, red, and even green colour at times, occasioned by the refractive powers of intervening vapour, are well known effects. These unusual varieties also have often appeared to accompany pestilence, in which case, we must suppose them, on the supposition of a general disturbance in the air produced by comets, to be secondary effects in the catenation of causes. And it is this secondary effect, namely, the pestiferous malaria, which marks out, on the surface of the earth, the tracts to be more violently attacked by pestilence

* Webster's Hist. Epilem. i. 89, and sequel.

† If this could be proved to be the constant effect of comets, the approach of Halley's great comet again in 1833, would be no very pleasing thing to those a tottering frame of body. *Comet jam, comet cream*, and so on are far terms for the supposed effects of comets on preserves, &c.

coming from the atmosphere. Rome, from its situation, has continued to be very much exposed to it, and some of the devoted pilgrims to the eternal city, as well as the most renowned Saints of the church, have fallen a victim to the scourge of fever which has prevailed there. Poor St. Aloysius, whose constitution was weakened and worn by his penances and mental labours, fell a victim to an epidemical season of this sort, in the year 1591, and expired at his prayers in the night between the 20th and 21st of June.

I find I must glance hastily over the history of pestilence now for want of room. About 30 years B. C. Jerusalem was devastated by a pestilence which, according to Dion Cassius, followed a comet. At the same time was an overflowing of the Tiber, and an epidemic at Rome, which followed the hard winter and unusual misplacement of phenomena, to which Horace's well known Ode, beginning *Jam satis terris nivis, &c.* alludes. The poet, well aware of solar and lunar influence over these events, in Ode 21 to Apollo, soon after, describes the benign influence of the sun, in a beautiful play of metaphors. An. B. C. 25, Palestine was again deluged by plague, which was preceded by the slighter forms of epidemia; which fact helps us to prove the progressiveness in the intensity of the atmospherical poison, and to confute the absurd notion of the origin of pestilence by contagion.

Soon after the reign of Augustus, a pestilence swept the fertile countries of Asia Minor, and during its prevalence, an earthquake completed the work. A comet is mentioned at the same time as the cause, whose tail is said with one fell swoop to have hurled down a dozen fine cities at once. It is to this catastrophe that Tacitus alludes in An. ii. 47. Whether the comet had a real connection with the earthquake, remains to be proved, or rather inferred, in proportion as we can establish from historical records, the doctrine alluded to.

In the year 40, the great eruption Aetna occurred, which frightened Caligula from Sicily. A famine followed, with pestilence, extending from Italy almost to India, and it

lated Babylon and other great cities. Soon after a comet was discovered. How the dearth came to be foretold by Agabus, I cannot pretend to say, but so it is recorded.* But I am now getting to a period when historical records are more numerous, and when from the increasing number of observations on comets and meteoric phenomena, with whose occurrence recorded diseases may be collated, I can abridge the form of detail, by presenting the reader with a more compendious view, in chronological order, of the astronomical phenomena, from which the electric weatherbane may possibly take its remote origin;—of the evidential atmospherical phenomena which accompanied it;—and of the nature and range of the epidemic. By this curious table, on which I have spared no trouble, it will appear that there is a repeated coincidence between these three sets of phenomena of so marked a nature as to leave very little of doubt on the mind, that they must have some sort of natural connection, as I have before hinted at. In fact there are many questions left so unsettled and involved in such obscurity, that till they are better known and resolved, we cannot pretend to say what connections exist between remote celestial bodies, nor what is the manner of their influence through the medium of their atmospheres. Much less, therefore, can we determine what particular phenomena they may produce on the organized beings that inhabit their surfaces and hold their lives on an atmospherical tenure. Just to convince the philosopher of the difficulties we are surrounded by, let me ask him, What is the connection between light, heat, and electricity, or between all of them and life? What becomes of the irradiating light of the innumerable stars that compose the solar and sidereal systems of which all penetrable space seems full? Does their light ever return again to an available focus? What is attraction and polarity? What is the use of comets in the celestial economy? Can they be collectors and transmutants of the electric fluid, or of light once expended by radiation? Can any of them move in parabolas or hyperbolas

* Sueton. in Calig.

and become vehicles of influence between systems immensely remote? All these questions, lying as it were in the confines of the physical and metaphysical philosophy, are only stated here, jumbled together as they are, in order to let the enquirer see the difficulties he would have to encounter, in making out any hypothesis, and of the consequent arrogance there would be in denying the truth of any; while those who know the right method of philosophizing, will spend their attention, in heaping up useful observations, and applying to them the powerful engines of comparison and analogy.

In the following more modern catalogue I shall first mark the date; then the conspicuous celestial phenomena; then the atmospherical; and lastly, the description of epidemic which prevailed; whereby the reader may see, not only the fallacy of the opinion, held by certain modern writers, respecting contagion, but also the possibility that the origin of pestilence, which is already proved to be atmospherical, may also be dependent, as a remote cause, on some connection between the matter or atmospheres of different celestial bodies, of which connection we have as yet a very limited notion. I place the authorities in the notes.

4 Catalogue of Pestilence since the Christian era.

A. D.

15. A Comet observed at Rome. Pestilence in Asia. Earthquake of tremendous violence next year.*
40. Eruption of Aetna. Famine in Rome. Pestilence at Babylon.† Caligula was frightened away from Sicily.
53. Comet. Earthquakes frequent; mock suns; famine at Rome: in the latter plague, numerous public officers died.‡
62. Comet, and plague. It was during the approach of

Dion Cassius, Tacitus, An. ii. 47. Plin. ii. 84. Euseb. Chron. 201.

† Suetonius in Caligula.

‡ Sueton. in Claud. †

A.D.

the above comet to its perihelion, that St. Paul was shipwrecked on the isle of Malta.

67. Comet. Destructive tempest in Campania. In the reign of Nero, a pestilence arose at Rome, which carried off 30,000 persons in a short time. If we credit Tacitus, the houses were full of dead bodies.* Earthquakes at the same time at Hierapolis and in Laodicea. 600 sheep killed in Italy by vapour from an earthquake.† The remark made by the Roman historian that there was no particular state of air or heat during *this* pestilence, shows that, by making an exception of this case, he confirms the conformity of others to the rule that remarkable weather attends it in general.

76. Comet with very long tail, in June, just before Vespasian died. It was followed by long drought and heat, slighter epidemics, and in November following by a tremendous eruption of Vesuvius; which was followed, again, by an earthquake, that swallowed up Herculaneum and Pompeii. A pestilence followed in Rome, in the year 80; and the same year was a terrible inundation in England, in which much cattle perished. One of the most important things to be remarked in this period, is the order of the phenomena, so often repeated since, but which will mark out the origin and nature of pestilence. The comet came first, then the drought, with the epidemics, then the volcanic commotions, and the progressive malignity of a pestilence ending in the destruction of 10,000 citizens of Rome in one day.‡ I must now mention a plague in which the connection was not quite so remarkable, for in the year 88 a pestilence aged in England; in 90, a comet recorded on slender

* Tacit. xii. 43.

† Seneca. Also Oros. vii. Magd. Ecl. Hist. ii. 53.

‡ Sueton. Pliny. Dion Cass. and Magd. ii. 14.

A. D.

authority, and Scotland infected with plague. We have no mention of comets or meteors accompanying the plagues of 102, 107, and 109. Fish actually died by thousands on the shores.

117. Comet observed at Rome. Antioch almost destroyed by an earthquake, accompanied by gales of wind : great overflowings of the Tiber. Slight earthquakes so frequent that Trajan limited the height of the Roman houses, for fear of danger. A plague of flies at this time increased so as to make the emperor abandon his expedition against the Argorini in Arabia.*

127. Comet recorded. Nicomedia overthrown, and soon afterwards Nicopolis, by earthquakes.

137. Comet, followed by plague. Thames nearly dry. —

154? Comet. Earthquake of Rhodes. Plague of Arabia.†

169? Comet ; which was seen during the period of general pestilence in Europe, Africa, and Asia, which began in 167, and ended in 180.‡ An unusual gangrene of the feet was one symptom of this pestilence, analogous to that of the thumb which I have related in Oxfordshire, a few years ago.

Although pestilence was almost universal at the period alluded to, the pretended historian Gibbon, calls it "the Halcyon days of Rome!" Antioch lost 100,000 persons by an earthquake. It is difficult to say what the long tailed stars were which Herodian describes as having been seen at Rome during the plague of the years 187 to 189.

211. Comet. The plague in London : flood of the Trent.

218. Comets are recorded, and a flood of the Tweed.

A destructive epidemic followed in Scotland.

252. A very pestilential state of air now commenced,

* Aurelius Victor and Pliny.

† Julius Capit. Mag. Cæst. ii. 13

‡ Ann. Marcell. xxiii.

A. D.

which spreading in various directions continued to ravage Europe, and Asia, and Africa, for many years, and was attended by peculiar symptoms. Gibbon calculated that near half the human race fell by this pestilence.*

280. Comet, and two years after it an earthquake in England.

289. A large Comet observed, followed by a severe winter, and a few years afterwards began the carbuncular plague of Busiris and Coptis in Egypt.

298. Comet seen. Earthquake in Syria. A dreadful plague, distinguished by anthrax generally, followed the omission of winter rains in Italy, in 311.

321. Comet : a universal famine in Britain in 325.

335. A prodigiously large Comet is recorded, and was considered as a forerunner of the death of Constantine. Soon after its appearance, Syria and Cilicia were desolated with pestilence ; and the Tweed overflowed.†

339. Comet ; followed by earthquakes. Deep snow in England, in 341. Julian frustrated in 362.

363. Comet ; and large meteors. The destruction of Nice and other cities by earthquakes in 367, do not seem to have accompanied any comets *on record*.

383. Comet observed : plague of Rome, and in Syria. This comet was evidently the blazing star mentioned by Nicephorus,‡ which was of a singular figure, and was visible thirty days. Soon after this, followed the filth and horrible plague of locust at Gaza and Asealon.

400. A comet, recorded of huge size and horrible aspect followed by an earthquake near Constantinople, and the plague.

The Euxine was frozen for twenty days the following winter. There were also severe earthquakes.

* Jornandes de Pest. Orosius, and Zosimus in Gal. i. 26.

† Eutrop. lib. x. Orosius, &c.

‡ Niceph. lib. xii. 37.

A. D.

407. A comet of a most unusual appearance is described by Nicephorus like a cone of fire, but what the phenomenon really was, is not yet cleared up; it lasted four months, during which time there were many luminous meteors, and earthquakes in foreign countries. Pestilence and famine prevailed together for many months afterwards in most parts of Europe.*
419. Comet, hail storms, earthquakes, and pestilence recorded.
441. Comet: overflow of the sea in Wales. Pestilence.
444. Comet: repeated earthquakes in Turkey followed; and then fever; and lastly, the plague most extensively. Great mortality among fish. The pabulum of plants seemed at length to be vitiated, and in England there was a great scarcity.†
- 450? Comet: great drought, famine, and pestilence.
457. Comet. Earthquake at Antioch. Pestilence.
467. Comet, in the 311th Olympiad. Earthquake in Greece.‡
Pestilence in Rome.

In order to abridge the detail, I may observe that I find comets recorded in the years 480, 482, 499, 502, 518, and 525, in the latter case followed by the tremendous earthquake at Antioch.

531. Comet, of great splendour, supposed to be the one whose period is 575 years, and which appeared 44 B. C. Plague in Wales. Sun very pale for a long time, and it is very remarkable that *the approach of the same comet* An. B. C. 1767, is recorded as having been attended with the same sort of paleness in the sun. || A similar paleness will hereafter be found recorded in 1783, the year of the great meteor which happened on St. Helen's day. This paleness was

* Niceph. xiii. 6 & 36.—Zosimus, lib. 5.

† Ibid. xv. 10.

‡ Byzantin. Hist. xv.

|| Procopius.

A. D.

occasioned by the prevalence of vapour all over Europe, during the eruption of mount Hecla.

539. Comet,* followed by tremendous famine and pestilence of a peculiar character, the skin drying "like parchment," and the depraved appetite called *lytta* prevailed. I find Comets, attended by pestilence, recorded in the year 558.

590. Comet: a terrible pestilence, in which Pope Pelagius died, followed. This was characterized by affection of the brain, that caused the patient to see dreadful phantoms, such as are described in p. 79. The plague was sudden and universal.† A long period near half a century followed, in which various epidemics of different degrees of malignity infested almost every part of Europe, accompanied at times by extraordinary visitations of locusts, and other insects.‡ It is asserted by Echard that St. Gregory instituted a procession at Rome at this time in consequence of the plague, and that during its slow progress upwards of 80 of the persons composing it fell down dead in the streets. According to Paul Diaconus, and others, this plague in some countries produced death with great rapidity, often on the first attack. In some persons sneezing was immediately followed by death, which gave rise to the custom of saying "God bless you" when one sneezed. In others, gaping was a mortal sign; hence the custom still preserved in some places, after gaping, to make the sign of the cross.¶ See also that inimitable code of antient learning, the "*Vitae Sanctorum*," and "Butler's Lives of the Saints," vol. iii. under March 12.

72. Comet, and "celestial flame," followed by plague.§

* This comet of 539 is the first recorded in Mr. Lee's excellent catalogue; its orbit was calculated by Buckhardt.

† Procopius, and Evagrius.

‡ August. hist. 1157.

¶ Paul. Diac. lib. 4. Mag. Cent. 6, 13, &c.

§ Short on Air

A.D.

678. Comet in August? visible three months. Pestilence.

715? Comet, of great splendour, whose periods give it to the following years, 30, 372, 715, 1058, 1401, 1743, and so on. Soon after this comet in 715, epidemics began to prevail, and as the malignity of the hane encreased, it at length produced the destructive plague of the year 717, in which 300,000 persons died at Constantinople.

717. Though no comet is recorded on good authority, authors have hinted at the appearance of one about this time, as preceding the severe winter and inundation of this year.

725? About this time the plague raged in Turkey, and a very remarkable vapour arose from the sea, between the two newly formed islands, Thera* and Therasia; this vapour deposited a dense substance, that hardened into a sort of pumice, which covered parts of Asia Minor. Can this throw any light on the hard substance called lunar stones, which are hurled down ignited in the form of meteorolites?*

729. Comets, two in number, appeared in January, the one seen in the morning, and the other in the evening: plague in Syria: the heavens are recorded as appearing in a flame, probably the effects of an Aurora Borealis.

743. Comet, preceded by earthquakes in Turkey and in Thrace.

774. Comet also seen, drought and great darkness followed, and in the sequel the plague, in many countries at once.†

750. Comet, earthquake, and plague in Turkey.

760. Comet; and in 762 two Comets, followed by extraordinary cold; the Euxine again frozen. In March following, meteors and falling stars were very nu-

* See my Chapter on Meteors, in Atmos. Phenom.

† Cedrenus. Paul Diac. 1019.

A.D.

merous, and in the hot summer which followed, pestilence, accompanied with the prodigious abundance of small flies.*

771. Although no comet is recorded, this being an exception to the rule, the plague raged in Europe, and 34,000 died of it at Chichester. The authority for this date is bad.

779. Comet, followed by earthquake at Constantinople. The year before there was a great darkness in England for the space of a fortnight.

810. Prodigious epizotic among herds of cattle. Next year locusts in France.

812. Comet, and eruption of Aetna again, after a long interval. I find Comets recorded, as followed by pestilence, in the years 817, 828 in *Libra*, 837, 839, 842, 850 with famine, 858,† 867, 872.

882. Comet, with a very large tail; followed by famine in Italy. In the several following years much plague and epizotic.‡ Antient Italian and German writers mention comets, followed by various atmospheric commotions and pestilence, in 994, 912, 961, 968, 975 in August, 981, 995, 1009, 1015, 1020.

1032. Eclipse of the sun, during which the air was of a saffron colour, in 1037. Aurora Borealis. Comets again recorded, with pestilence, in 1042 (with deluge), 1053, 1066, 1068 in May, 1074, 1091, 1094, 1096.

1097. Comet in October, followed by earthquake of Syracuse, and next year by the celebrated inundation in Kent, which formed Goodwin's Sands.

1101. Extraordinary meteor: destructive increase of butter-flies.

1103. Comet of peculiar colour; and a new star seen for three weeks.¶ Comets again recorded, followed by

* Magd. Cent. viii. 13.

† Muratori speaks of two very unusual stars in 855.

‡ Muratori, li. 90.

¶ Pingré. Germ. Script. vo

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meteors and famine with more or less of pestilence, in 1107, 1108, 1109, 1126, 1133, 1165, 1181.

1186. An unusual conjunction of planets in *Libra*, the people being then addicted to astrology, got frightened, and a fast was ordered by the Archbishop of Canterbury. Pestilence among cattle next year.

1219. Comet and pestilence.

1222. Comet of great magnitude, with hot summer, as usual, followed by deep snow, and then earthquakes; and also an eruption of mount Hecla. The whole period, indeed, from 1219 to 1226, was pestilential, the epidemic traversing Europe. From this time to 1230* no Comet is recorded, though pestilence continued to prevail; but I can prove by a calculation of chances, that the probabilities of there being a Comet during that time, exceeds 39 to 2. I can also show that the chances render a Comet probable every second year.

1230. Comet, from this time to 1233. Devastating pestilence broke in Italy, Denmark, and France at once, and continued nearly the whole of the three years. There was a famine in England, and 20,000 persons are recorded to have been starved! The Comet alluded to passed its perihelion on the 30th of January, 1231.† In this, as in other cases, the summer and autumn of 1230, when the Comet appeared, was intensely hot, inundations in Rome followed, and pestilence raged the whole time, while a severe frost eventually succeeded in the last winter, and the plagues ceased.

1240. Comet, in February, was preceded by pestilence, and a new star, said to be "like Lucifer?" Authors record an extraordinary war among fishes on the coast, but this was only an ignorant method of ac-

* Webster is very inaccurate in his account of this period, as I have proved by collating chronologies.

† Pingré.

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- counting for the dead fish which filled the shores, owing to the epidemic.
1243. The plague again in England; drought and meteors.
1252. The plague broke out in London at Michaelmas, and overspread England through the winter; there was a murrain of sheep next year, and a curious disease became epidemic in the tongues of horses.*
1255. Comet; rivers overflowed, and heavy tempests and rains.
1256. Comet; storms violent, and in 1258 famine in England.
1264. Comet, passed its perihelion,† July 6 (see 1556). There had been a severe frost the year before, pestilence of both men and cattle followed.
1268. Comet; the following year pestilence seized the crusaders proceeding to the Holy Land: the Comet continued visible.
1274. Comet, "of fearful species." Rot among sheep was epidemic, and first known in England. Dollert Zee in 1277.
1285. Comet, famine, and great darkness prevailed.
1293. Comet, great snow storm in May. Pestilence and famine.
1299. Comet, *per. pass.* 31st March. Prodigious mortality among Jews.
1301. Comet, *per. pass.* in November, attended with pestilence.
1312. Comet; eruption of Hecla; famine in Bohemia, and in Poland. In England it prevailed in 1314.‡
1337. Comet, *perhi. p.* June 2. Another Comet is recorded, but on very doubtful authority; pestilence prevailed, and flood at Florence.
1339. Comet; eruption of Hecla, and great floods.
1345. A pestilential epidemic, being alarming for its extent

* Short, on Air, i. 49.

† Pingré.

‡ Henry's Hist. Brit. 4, 90.

and duration, it attacked almost every country of Europe, Asia, and Africa, under various forms of plague, &c. ; by 1350, it had overrun Germany and the north : it was accompanied by earthquakes and volcanos, and by the Comet of 1351, hereafter to be recorded.

Comet recorded "of frightful aspect," in the reign of Edward III. In the Ouse, there is recorded a flood just before Ascension Day ; the whole year was very unhealthy, and earthquakes abounded in Sicily and in Germany. In China there was, what is called in the east, a plague of insects. It ought to be particularly remarked, as bearing directly on the doctrine which I have maintained, that in this, as in many other pestilential periods following comets, and during the play of Nature in earthquakes, a general unhealthiness arose, which first showed itself in epidemic, sore throats, pleurisy, quinsy, spotted fever, and various other slighter diseases, in a varied succession, and lastly, in the violence of the true bubonic plague, and that it subsided in the same manner, the retrogressive order of the various disorders corresponding to their previous progression. In London, so great was the mortality that 50,000 bodies were buried in a week ; Norwich lost nearly as many ; Venice, 100,000 ; in Lubeck 90,000, and in Florence 90,000 ; other cities in proportion. Spain is said to have lost 20,000,000. Parson Malthus might have spared himself the trouble of his plan of preventing pauper weddings, to check population.* Febris has always taken care enough to thin the progeny of Venus without our putting an extinguisher on the torch of Hymen.

Plague continued. Denmark scourged by the *Sorte Diod* or black death, a peculiar pestilence. The clergy suffered much at this time.† Prodigious

* See Malthus's "Essay on Population," 8vo. London.

† Knighton, col. 600. Stowe's Survey, 478.

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epizotic, and universal death among fishes, which had blotches on them. The pestilence was general, except in Brabant, and in the country about Milan.*

1351. Comet, *per. pass.* 26th November. Pestilence still general,† with a long hot drought. A series of evils followed: in England the strange epidemic madness is recorded, which was at its height in 1353, and soon after broke out the terrible plague by which Florence lost in 1358, 100,000 citizens. Boccace, in his animated *Descrizione della Peste di Firenze*, rightly ascribes this pestilence to the state of the air.‡ Petrarch says, that few escaped it. Women in child bed were particularly singled out, and in the court there succeeded a murrain of beasts. Though no Comet is recorded this precise year, I have satisfied myself by a calculation of the probability, by three to one of there being one within our system at this time.

1501. Comet? Plague of England, France and Lombardy, and Scotland.

1362? Comet,|| with a prodigious coma in N. E. in March;

* Muratori.

† The extensive and frequent pestilences of former times have yielded to a milder form of epidemia, since the more general use of garden vegetables, and a better knowledge of the stomach and its functions.

‡ Bocc. *Pest. Firenze*. Muratori and Pistocini, vol. i.

|| It may seem to some extraordinary that so many antiently recorded Comets should be lost, or that their periods should not have been calculated: but to me it appears that these extraordinary bodies are so circumstanced, that their paths are destroyed by disturbing forces capable of converting their elliptical orbits into parabolas and hyperbolas, and thus throwing them out into space till they chance to get into the attraction of other fixed stars, when they may, by the operation of other attractions, become part of remote systems, and thus perform some office in the universal economy at present unknown. See the observations of Newton, La Lande and La Place; also an excellent article on Comets, in Rees' *Encycl.* said to be by Mr. Stephen Lee; also Prof. Schulmackers *Catalogue of Comets*; the *Observations of Eucke*, and a late Prize Essay, by Mr. Milne. Nor should we omit to examine a famous work of the 15th century, the "*Theatrum Cometicum*," folio, Amst. 1667.

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- volcano ; violent plagues, and eventually murrain of cattle. Much snow and hail recorded, and a winter of great severity.
1373. Insanity visited the people as an epidemic ; no one could call this contagious ! and yet it spread as disorders do which are vulgarly called infectious. This epidemic determined the blood in such violence to the brain as to occasion the delirium often ending in madness ; and it may be remarked that this disease prevailed while the volcanic eruptions of the next year were gathering.
1374. Violent volcanic eruptions : plague and famine abroad.*
1380. Comet : as it approached our system, epidemics began to prevail, and at length the plague succeeded, and visited parts of Germany : in 1381 Aetna was again on fire, and in 1382 a dead calm prevailed all the year.†
1389. A singular meteor : fatal angina epidemic among children : followed next year by plague in the North of England.‡ It was succeeded by a fatal dysentery. || Mr. Webster conjectures that during the burning of volcanos the same subterranean fire emits through various parts of the earth a pestiferous weather-bane.
1402. Comet again appeared in March, whose period is 343 years. See anno. 1744 ? The years preceding and following it were pestilential.
1406. Comet : the plague in London only destroyed 30,000 people.
1411. Comet ? Plague in Aquitaine and Gascoigne : prodigious tides.
1421. Comet ? Zuyder Zee formed by dreadful floods : eruption of Hecla.

* Muratori, vol. iii. 649.

† Short, on Air. Lib. Nig. sec. 441.

‡ Pistor. Ger. Scr. vol. i.

|| Webster, ii. 227.

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1426. Comet; hot summer; destructive earthquake in Spain; plague. I must pass over many epidemics for want of room, and of authentic histories of them. 1440 small pox. 1443 plagues at Batavia. 1445 falling sickness; plague in Italy.
1449. Comet seen: extensive plague in Asia and Europe followed.
1455. Comet; probably not the same as that next year.
1456. Comet whose p. p. was June 8, period $75\frac{1}{2}$ years: the same year a tremendous earthquake in Italy destroyed 40,000 people.*
1472. Comet whose per. pass. was Feb. 28. Two other comets are recorded this year, but probably one of them might be the same observed before, but returning from the sun: the following year heat and drought: great rivers dried up. Earthquakes, plagues, and volcanos. The plague of Paris in 1477, destroyed 40,000 persons, and Italy was overcome by locusts.
1483. First appeared the celebrated epidemic, called the Sweating Sickness or *Sudor Anglicus* which carried off great numbers from time to time. This disorder attacked those who fed well and were in high health.† About the same time the plague changed its character according to authors,‡ and it is said to have resumed its former character a century afterwards. Scotchmen escaped the sweating sickness from their more prudent way of feeding: it recurred says Webster in 1506, 1528, and 1551.
1491. Comet. wet season: epizotic and famine.
1500. Comet visible in *Capricorn*. Eruption of Vesuvius. Plague in London. Epidemic leprosy with foul ulcers in Germany. A severe winter followed: in 1502 great heat and a fatal plague in Brussels, so

* Pingré. Pistorius and Muratori, v. 50.

† Life of Erasmus, 347. Friend's Hist. Med. 566.

‡ Traité de la peste, 43.

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- destructive, that grass grew in the deserted streets.
1505. Comet; plague in China and spotted fever in Europe. Sweating sickness still in London, and pestilence in Lisbon. In 1508 earthquakes, in 1510 the influenza, which in Paris produced the costume of the *cocoluche* or catarrhal cowl.
1511. Comet appeared, whose approach last year probably caused the *aforedescribed* epidemics. The plague of Veronay, and the dysentery with black blotches followed.
1514. Comets recorded? Mortality among cats. Plague of Tournay. Murrain of beasts in England.
1521. Comet: great inundations, sickness, and famine.
1530. Earthquake destroyed 1400 houses in Lisbon.
1531. Comet passed its perihelion on St. Bartholomew's Day, O. S. it was preceded the foregoing year by spotted fever all over Europe at once, and followed by plague. Aetna on fire again.
1532. Comet perih. Oct. 10,* its period probably $129\frac{1}{2}$ years.
1533. Comet perihelion on June 16. Volcanos in America. The whole of the above period exhibiting three comets was very pestilential.†
1538. Comet. Aetna erup. Earthquakes: pestilence.
1545. Eruption of Aetna. Plague in Geneva; and a disorder, called the *Troup Gallant*, prevailed in Europe, which attacked florid robust people, and rapidly carried them off; the symptoms were febrile, with violent pain in the head. Charles Duke of Orleans died of it in a monastery at Abbeville.
1548. A horrible and loathsome pestilence in Saxony, and afterwards in London and other places. Great rains and locusts in Italy.‡

* Halley supposes this to be the same as returned in 1661. I have inserted those comets in italic which are recorded and calculated by astronomers of known character.

† Short and Mignot ii. 4.

‡ Thuanus: hist. lib. i. and iv.

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1550. Comet in March ; eruption of Aetna and Lipari.
1551. Deluge of rain, sweating sickness in London ; plague producing sweating of blood in Messina : pestilence general.
1554. Comet, eruption in Iceland : fevers followed in 1556.
1556. Comet, which passed its perihelion in April 21, supposed to be the one of the year 1264 : eruption of Aetna : the spotted fever and the confluent small pox raged all the year.
1557. Comet. Inundation of the Tiber : epidemic catarrh with cough was almost universal ; bleeding and the usual methods proved hurtful, and 2000 persons fell a sacrifice to it at Madrid. At Alkmaar in October persons were seized with a fatal sore throat. Forester describes a prevalent bad smelling vapour. 1556 plague at Viena. 1557 in Holland, of which meteors were forerunners : spotted fever in Spain and Tuscany.
1558. Comet ; very hot summer. Intermittents prevailed in winter. Charles V. of Germany died.*
1560. Comet, scarcity of corn in England ; in 1563 the plague was in London and most parts of Europe with terrible mortality. Castaglio died of it at Basle. Earthquake prevailed, and one in England is recorded in September.
1564. Comet. Northern lights and inundation of the Thames : spotted fevers and the quinsy followed, and in winter a very severe frost. The following year Charles IX. held a Council of Physicians in France, one fourth of his people having been reported as dead of an epidemic fever.
1566. A miserable epidemic overspread Europe of an intermittent kind, the fit beginning at three o'clock p. m. with shivering, and ending in fever with horrible boils, ulcers, and spots.†

* Van Swieten *Comment.* xvi. 23.

† Stenkius, 770. Short, vol. i.

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1569. Comet; spotted fever universal and turned into plague.
1570. Earthquake in Chili.* Inundations in Holland. Earthquake in Italy.
1572. A new star (probably a comet) recorded brighter than Jupiter, which appeared in *Cassiopeia*: it was stationary for 16 months and then vanished. Epilepsy in France. The plague now for many years appeared sporadically in Europe. In 1575 beetles and flies numerous.
1576. Plague of Venice, preceded by slighter fevers as usual.
1577. Comet with very long tail, supposed to approach very near the earth, p. p. Oct. 26, forewarned by tempests.
1578. Comet and eruption of Aetna. • Earthquakes in England. A general pestilence in Asia and Europe seems to have prevailed from the time of the comet of 1569, till the one now under consideration.† The state of the air in Oxford destroyed 300 persons.
1580. Comet appeared in October; p. pass. Nov. 28; was visible two months. A pestilential period seemed to arise this year, which in succession devastated the principal cities of Europe, from Rome to Turkey, Russia, and London. Medicines and bleeding were wholly unavailing. Prosper Alpinus relates that in one year 500,000 died in Grand Cairo alone.‡ It was very virulent also in France and in Egypt. || The same year the Marshes in Essex were devastated by an unusual abundance of mice.

The gluttony of the people in the Protestant States since the "Reformation," had by this time occasioned such an increase of pestilence by enhancing the pre-

* Short: also Encyc. Art. Astr.

† Riverius, lib. 4. 7.

‡ Pros. Alpin. de aere et elemento.

|| Thuanaus and Riverius, 17.

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disponent causes, that Queen Elizabeth issued various proclamations to arrest it, respecting tenement and building: however pestilence continued to prevail, and the visits of epidemia were alarming.

1582. *Comet* perih. pass. May 7. Earthquake near Lima: tempest in May.*

1583. Earthquake in England: the plague in London and elsewhere.†

1585. *Comet* perih. pass. Sept. 27: epidemic pleurisy in England.

1586. *Comet* again: earthquake at Lima: plague in Turkey, Hungary, and Austria: locusts overrun Thrace: next year war and famine so augmented the predisponent causes that the epidemic plague took great effect in Flanders. Canine madness epidemic at the time.

1590. *Comet* passed its perihelion January 29, and was as usual attended with epidemic phenomena: a peculiar fever called "Hungarian," broke out in England, and was falsely ascribed to importation—like the "Hessian Fly" which destroyed wheat in America, a fly unknown in Europe. An earthquake shook Europe, and also the Azores; and the year following an influenza raged universally; plague in Finland;‡ a spotted fever in Trent, and soon after at Florence, affecting chiefly the nobles and the luxurious; indeed pestilence was so general that another comet was expected, which in fact appeared as we shall find next year.

1593. *Comet* p. pass. July 8. Earthquake in Persia foreran it: also plague of Shropshire: severe winter 1594.

1596. *Comet* July 1. St. Ignatius' Day: epidemic phrenitis.

1597. *Comet* recorded. Influenza, cold winter. The slighter pestilence led to a great plague in England and also

* Ulloa's Voy. ii. 7.

† Maidland and Short.

‡ Thuanus.

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in Turkey and other parts in 1598. Cannons were fired and aromatics burnt to shake and purify the air : in 1599 plague in Italy, Portugal, and Spain.*

1600. Comet? Earthquake in Italy : pestilence everywhere played the part of Erynnis, and scourged Europe for some years.

1607. Comet p. p. Oct. 16. Geographically determined by Newton.† Great atmospheric commotions, and swell of the ocean and rivers : a winter of uncommon severity followed all over the world.

1609. Comet. Earthquake at Liina ; eruption of Aetna ; plague. Sailors at sea seized with calenture to a great extent. Thirty dead bodies in one day thrown overboard in Sir Thomas Gates's fleet bound to Virginia. Neptune and Jove were on bad terms the whole year, and so rough were the waters that it was many years before sleek Panope and her virgin sister would gambol on the level brine again : in 1610 influenza ; a fiery arch seen in Hungary.

1612. Comets : storms at sea laid 2000 dead carcasses on the English coast, and 1200 on the Dutch shore. Plague in Constantinople destroyed 200,000 persons the year before. In summer Europe was covered by grasshoppers. In 1613 the cats were transported to Scutari, under a false idea that they were the cause of the plague, being themselves distempered.‡

1614. Comet? Suspected eruption of Aetna ; small pox raged as an epidemic throughout Europe and Asia, and measles in Persia.

1615. Quartan agues epidemic, hot summer.

1618. Comet August 7, and another Comet October 29, both calculated by Pingré. Authors however speak of more. Earthquake in Rhetia. Hurricane in Bermuda.

* Mignot Hist. Turkey.

† Newton's Principia, 524.

‡ Short, and Mignot.

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Pestilence in America. Plague in Europe.

1620. Comet, followed by cold winter; violent storms and tides. The following year an epidemic small pox.*
1622. Comet, the beginning of a pestilence of progressive malignity is traceable, ending in plague.†
1625. Comet, and eruptions of Hecla and one in Palma. Plague in London, pestilential period general, and in the course of a few years the loss of life was immense. In 1630 the plague was at Cambridge. In 1632 Vesuvius lost 200 feet of altitude by burning. Earthquake of Naples.
1633. Comet, severe winter afterwards. Pestilence. Aetna volcanic for five years. Earthquake in London. Pestilence at Halifax.
1635. Comet? Eruption of Vesuvius and of Aetna, and earthquakes. Plague of Leyden, and murrain of cattle. In America a memorable tempest on the feast of the Assumption of Our Lady, old style. It ought to be noted that while plague raged in Leyden, other towns in the outskirts of the pestilence suffered from slighter epidemics.
1638. Earthquake in Calabria destroyed 30,000 lives, also extensive earthquake in America in June: tremendous storms of wind in Autumn, and a season of general ill health.‡ In 1639 swarms of small flies on the sea near the coast. The plague still in London, and so continued more or less till 1648.
1640. On the 11th. September, O.S. a remarkable meteor

* The history of the small pox affords a remarkable illustration of the relation between the exciting and predisposing causes of disease. For that disease, before inoculation and vaccination were introduced, visited most countries during pestilential seasons as an epidemic: now its visits are fewer and its virulence lessened, because a more powerful atmospherical exciting cause is requisite to produce the same effects, since an antidote has been found for the predisponent. The measles is still a frequent epidemical visitant.

† Webster, i. 240.

‡ Winthrop, p. 165.

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in America, at a great elevation, early in the morning. A malignant epidemic fever in England. Hard winter. Very curious meteors seen at Boston the following years.*

1645. Comet? Epidemic dysentery very fatal in England. In 1646 inundations in Holland.
1647. Comet. Earthquake in America.† Plague in London, and in America the influenza was general and very fatal.
1652. Comet, pass. perih. All Soul's Day.‡ A dangerous synochus fever in France, and tertians were epidemic in Denmark. Earthquake in South America. Eruption of Vesuvius.
1655. The winter had been hard. Influenza again in America, and in June a fatal epidemic cough prevailed. Plague in Turkey, Moscow, Chester, &c.; it became general in Europe. I suspect there was a comet in 1656?
1658. Earthquake in America. Plague in Naples. It got to Genoa, and lasted with progressive malignity there for two years.
1661. Comet, per. pass. on St. Marcellus' day, supposed to be the comet of October 19, 1532.‖ The *Cynanche trachealis*, in America, attended the approach of this comet, as a fatal epidemic; and next year an earthquake. A fatal disease of sheep and cattle broke out in England; and it is observed by Sydenham, that at this time, 1661, disease began to assume a new and fatal malignity that increased progressively till the great plague of 1665, hereafter to be recorded, and which attended the remarkable comet of that year.
1664. Comet, whose p. pass. was on November 24; pestilence and unhealthy weather increased all this year.

* Winthrop, p. 232.

† Ulloa's Voyage, 87.

‡ Halley.

‖ Halley.

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1665. *Comet*, p. pass. April 14. This was the year of the memorable epidemic, called the Great Plague of London. The previous winter had been severe and unhealthy, and various epidemics had prevailed all over Europe, when in June the plague appeared in London. The folly of believing that this plague was imported was soon exposed, as it was found to have broken out in many parts of Europe at once, during the two preceding years.* This plague threatened, after a temporary suspension, to return with its former violence in 1666, but it was apparently soon put a stop to, by the fire of London, of September 2d of that year, which might act two ways; firstly, on the *exciting cause*, by purifying the air, and secondly, on the *predisponent*, by its local effects on the city, almost desolated and in ruins. Some mendacious Protestant writers of the day ascribe this fire, in many respects a lucky calamity, to Catholic incendiaries, and the lie is still perpetuated, by inscription, on the monument near London Bridge.† The fire was purely accidental, and as to the plague, it is remarkable for being the worst, as well as the last, that has visited London. Earthquakes prevailed next year in America, and the plague and a dysentery in England.
1668. *Comet*, with prodigious coma? A dry summer, and malignant atmosphere in America, with the zodiacal light, accompanied by bilious fever. In 1670, mock suns in Hungary, and tempests. A disease prevailed in Westphalia among cats, who had an eruption about the head, and died lethargic. In Norway, malignant measles.

It is remarkable that Sydenham has described, with accuracy, a succession of dreadful epidemics.

* See various accounts of this plague, but particularly that of Webster, *Epidem.* vol. 1. p. 319.

† Webster, Pope, and others.

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which prevailed in England about this time. Indeed the whole period, from the usurpation of Cromwell to the end of the 17th century, was as much distinguished by pestilence, and bodily diseases of all sorts, as it was by moral depravity, and they came together among the numerous ills that the heresy of the preceding century entailed on the country, by destroying the fasts and salutary habits of an austere Catholic life, and augmenting the predisponent cause of pestilence, in the vitiated constitutions of that age of debauchery, in consequence of which the excitant which came in the air acted with redoubled fury.*

1669. *Comet*, with a vast coma, p. p. October 7. *Meteors*. Family killed by vapour from the ground near Amiens : hot summer and pestilential air.

1672. *Comet* whose p. pass. was Feb. 20. Measles and small pox, which had *alternated* in London, gave way to catarrh and spotted fever.

1677. *Comet*, April 26, seen returning all May : earthquake in England. Small pox epidemic in America.

1678. *Comet* p. pass. Assumption B.V.M. Plague of Algiers ; epidemic angina. On the 12th January extraordinary darkness in England at noontide : pestilence prevailed ; cold winter followed.

1679. *Comet* ; plague of Vienna ; various epidemics.

1680. *Comet*, with long tail, perhaps the largest ever recorded, appeared in Autumn, whose period is 575 years, we have recorded it therefore before in our catalogue, and it is supposed to be the comet of the reign of Justinian. This remarkable comet was observed by Sir Isaac Newton, and its elliptical orbit determined by him as well as by Euler.† Severe winter and hot dry summer followed. Meteor in Germany.

* Neal Hist. vol. i.—Sydenham, Meade, Webster, &c.

† Newton's Princip. 501, Euler Theor. Plan. et Comet, Ferguson's Astron. La Lande, &c. &c.

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1681. Comet, volcano, dry summer; it will be observed that a general pestilential period prevailed again during the five comets of this, the last, and the following years respectively: *ignes fatui* seen all over the Swiss mountains preceded the earthquakes: pestilence encreasing.
1682. Comet p. p. September 4. Plague actually sporadic in Europe.
1683. Comet passed its perihelion on the festival of the Visitation B.V.M. Volcanic eruptions; plague extensive: various epidemics of singular character both of men and beasts, and in all countries, are recorded.^d The hungry fever in Leyden was a remarkable instance of peculiarity.
1684. Comet p. p. 29th May. Malignant dysentery all over Europe. In 1685 more general health.
1686. Comet, p. p. 6th September. Tremendous storm of hailstones at Lisle. A similar hail once fell in Brussels: eruption of Aetna. 1687 earthquake of Lima in October.
1688. Earthquake of Smyrna. Swarms of insects foreboded a pestilence; an epidemic catarrh followed all over Europe, beginning among horses and ending with men as is frequently the case.
- 1689 Comet, p. pass. on the feast of the Presentation B.V.M.† Spotted fever, small pox, and others; then followed murrain of sheep; in 1692 earthquake of Port Royal, and blight of corn. Earthquake in September felt in England, Germany, France, and Switzerland: fevers raged all this time.
1693. Comet? The famous earthquake of Sicily felt at Naples, occurred January 16th, and it was preceded by the strange fire from the ground which receded as one approached it.^e Volcanic eruptions general.

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In October an influenza began among horses and then attacked men as usual. In 1695 apoplexy became quite epidemic in Italy.

1698. *Comet* whose p. p. was Oct. 8. Volcanos and earthquakes: influenza of great extent in America, all the preceding winter, and followed by malignant spotted and other fevers; catarrh among horses and then among people.
1699. *Comet* whose p. p. on St. Genevieve's Day. Eruptions continue; very pestilential period. In 1700 suffocating catarrhal fever among children in the North of Europe, and a corresponding epidemic angina maligna in the Levant. 1701 Vesuvius burning again.
1702. *Comet* p. p. March 2. Aetna burning. A period prodigiously pestilential. Scarlet fever in America. So much pestilence in England that a general Court at Cambridge of the Senate was held on the subject. Small pox followed. A plague at length succeeded in America.†
1706. *Comet*, January 19. A variety of perturbations in the elements preceded for two years the approach of this comet, and the period of its lasting near our sea was one of very general pestilence. The inundation of Cork had happened in the preceding year.
1707. *Comet*, Nov. 30. Vesuvius burning. Early in the next year began the influenza, a sort of catarrh, to prevail all over Europe, which was followed by a period of plague and of ill health.‡ The winter of 1708.9 was very severe.¶ It was observed that those who used a full diet suffered also pleurisy. Persons excluded in religious retirement escaped the disease,

* Webster.

† Smith, H. N. of New York, p. 104. Journal Assemb. i. 151. Webster, 351.

‡ Phil. Trans.

¶ Short, vol. i. and Launceas. 194.

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and so did prisoners and all others kept from the air abroad. Danzig and its vicinity lost 25,000 by plague. Copenhagen nearly as many. In 1708 an immense quantity of spiders appeared, which were accounted a presage of the plague: on the 11th of August a strange mist, and in October a blue fiery meteor. In 1710 Stockholm lost 30,000 by pestilence. The same year the Dunkirk rant, a sort of catarrh, prevailed in Flanders, and the spotted fever at Norwich.

1712. Comet? Vesuvius flaming. Earthquake and pestilence in America. Giddiness and vertigo with pain epidemic in London.
1716. Winter severe, and a fair held on the frozen surface of the Thames.
1717. Comet, whose approach was marked by earthquake and volcanos.* Prodigious storm of snow in America.
1718. Comet p. p. on St. Genevieve's Day, January 3.* A hot summer followed this comet as usual, and pestilence prevailed. In March, 1719, a splendid meteor traversed the heavens, and Halley calculated its diameter to be above a mile and a half! it was many miles high.† The plague destroyed 80,000 in Aleppo.
1723. Comet pass. perih. about Holy Rood. The period between the last comet and this was proverbially pestiferous: and there were many volcanic eruptions. Confluent small pox raged in England.
1729. Comet p. p. June 14. It was preceded by putrid fever as an epidemic in Europe, and followed by a universal influenza in almost every known country. The attack was sudden, and the event frequently fatal. Malignant pleurisies, and at last plague, followed in Cyprus. Vesuvius was burning.

* De la Caille.

† Forster's Atmos. Phenomena, 3rd Edit.

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1732. Comet recorded: earthquake: plague of Tripoli: Catarrh in America. In 1734 scarlatina in Scotland. Meteors prevailed at this time.
1734. A ball of fire is recorded as having passed through two steeple windows at Air, in Scotland, broke part of the bell machinery and descended to the earth. It was probably a small meteorolite, which phenomenon I believe to be formed often by descending meteors.
1735. Earthquake of Popayan. Fever prevailed. Birds died in cages extensively, and the hydrophobia became prevalent. A pestilence set in which swept off nearly all those who had fed much on pork.
1737. *Comet* p. p. January 19. The perihelion of this comet happened in the midst of a most pestiferous period: malignant anginas and other lesser forms of disease began, and the yellow fever in America and the plague in Europe finished the catastrophe: almost every variety of morbid phenomena is recorded as following this period.
1739. *Comet*, p. p. June 6, which was followed next winter by the long frost, which lasted till March, 1740; and what is remarkable, in the other hemisphere a similar winter prevailed the following year. The whole period was very unhealthy. The hooping cough, spotted fever, and small pox, raged in succession till the end of 1741. Ireland lost 80,000 persons by famine and by dysentery.
1740. Don Ulloa says, that the Black Vomit, as it was called, was first observed in Guayaquil, this year.
1742. *Comet*, p. p. on St. Chrysostom's Day.*
 ——— *Comet*, December 30. I find by accounts that an epidemic constitution in the air still prevailed in most parts of the world, and so continued

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till the end of 1744, and it is a curious coincidence, again, that this unhealthy period was, like the last, marked by a succession of comets.

1743. *Comet*, p. p. 30th Dec. the same year; it was of great size, probably the comet of 1401 returned. Comet passed its perihelion, just after the festival of the Nativity of Our Lady, which was, therefore, about four days before the autumnal equinox: at this time a malignant sore throat, for a long time past epidemic, began to be considered contagious from its great prevalence; the same in America. There were, also earthquakes.* Messina, in Sicily, lost 46,000 persons by the plague.
1744. *Comet*, February 19. Severe influenza overspread Europe in spring: earthquake in June in New England.
1746. Earthquake destroyed part of Lima and Calao; it began on the feast of SS. Simon and Jude. This year produced a new and fearful epidemic in America, called the Nervous Yellow Fever.
1747. *Comet*, February 20. Aetna again burned; the bilious plague of Philadelphia. Tremendous hurricane in the West Indies.
1748. *Comet*, April 17. Cold winter, and unhealthy.
 — *Comet*, another, June 17. Hot dry summer that and following years: the 18th June, 1749, was a very hot day, and Mars is recorded to be in his perihelion.† Dysentery prevailed.
1750. Comet recorded: hot summer. Fez lost 30,000 by plague. Great swell of the Severn and the Sueti; a pestilence of Beauvais broke out.
1751. Vesuvius erup. On the 7th March, tempest at Nantes; and on the same day hurricane in Jamaica. Constantinople lost 200,000 by plague, which the

* Webster, vol. i. p. 386.

† Moore's Almanack for 1749.

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old Turks predicted from the last winter being so severe. The vernal flights of pigeons very large in America. Murrain of horses in England, and in Cheshire 30,000 cows died of an epizotic.

N. B. After this period the dates refer to the New Style.

1754. Earthquake in Egypt. Gangrenous sore throat in England. Aurora Polaris. Maryland was deluged with rain and infested with intermittents.*
1755. Memorable earthquake of Lisbon on All Saints Day.
1756. Comet, eruption of Hecla, meteor, famine.
1757. *Comet*, p.p. on St. Ursula's Day. Influenza began in America, the next year in Europe, and, lastly, it was followed by plague, and general pestilence for several years; marked also by the number of comets. Great meteor in November, described by Sir J. Pringle, in *Phil. Trans.*
1758. *Comet*, whose p. p. was on St. Barnabas' Day.†
1759. *Comet*, p. p. 12th March. Great meteor 4th April, at Bombay.
- *Comet*, p. p. Nov. 27. Earthquake of Damascus.
- *Comet*, p. p. Dec. 16. Pestilence general. A mortal scurvy prevailed in Canada: typhus in Bethlem.
1760. *Comet* recorded in January, perhaps the above. In 1762 great frost.
1762. *Comet*, May 28. Earthquake. There was an influenza in America, and Webster thinks an epidemic of this sort visits that continent once in about ten years.
1763. *Comet*, p. p. on All Saints Day. Eruption of Aetna. Very pestilential time in America.

* Gent. Mag. 1755.—Smith's New York, p. 82.

† Pingré.

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1764. *Comet*, Feb. 12. Hot summers, and dysenteries in autumn. Yellow fever in America.

1766. *Comet*, p. p. Feb. 17.

— *Comet*, p. p. April 22. The summer became very hot and dry, and the winters preceding very cold. Snow lay at Naples. Actua, Vesuvius, and Hecla all burning. Earthquake in America. Great failure of crops. The winter following was also very severe.

The above notes are abridged from authentic printed historical records. In the following continuation of the Chronology, I have been assisted by MS. notes from a journal of Meteorology and Physique, kept in my family for nearly 70 years.

§ *Historical Notes from 1767 to the present Year 1829 inclusive.*

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1767. Epidemic catarrh in Europe, and a general disorder among horses recorded; cotemporary with which I find in a journal of my grandfather's, under All Saints' Day, the following note:—*Two disorders have been very universal among horses, one a violent swelling of the legs and eyes; the other a cough with which horses were taken this day, and what is very remarkable scarce any either a day before or after.**—Again,—*A very windy time, particularly about the full moon, Nov. 6.*

1769 *Comet*, Oct. 7. The year pestilential?

1770. *Comet* in August, which passed perih. on the vigil of the Assumption, in R.A. 0. 4. 4.

— *Comet* the same year, p. p. on St. Cecily's Day. The first of these was accompanied by an eruption of

* Journal, E. F.—I find that June 30th the same year he had recorded a blight of fruit, and added "*Feverish complaints and pain in the face and teeth very epidemic.*"

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Vesuvius, and the second followed by that of Hecla, and an earthquake in New England in 1771. Both these two years were distinguished by extraordinary events: in 1770 the floods were greater in England, France, and Holland, than was ever remembered. I suspect that it was this year that the curious adventure of a cock afloat in a bowl of barley happened, near Rotterdam, which is described in the Perennial Calendar. The vintage in the South of Europe was much injured. The plague raged in Turkey, and a famine from heat and drought followed in India. There was a remarkable volume of flies in Calcutta filling the air, and a plague of worms is recorded in America, they passed, all in one direction, over the whole of the northern part. See Webster, p. 423.

1771. *Comet* p. p. April 19, which seemed to have an hyperbolic orbit. Earthquakes continue; a singular pestilence destroyed thousands of foxes in America. About this time, according to Sinclair, began the disease among potatoes in Scotland, which for many years infested them. In America anginas and catarrhs prevailed.
1772. *Comet* p. p. Feb. 18. Great snow in America. Influenza and then measles epidemic. Pestilence in Bohemia swept off 168,000 persons: and the same year 150,000 were lost in the tempest on the river at Canton, in China.* Hurricane in West Indies.
1773. *Comet* Sept. 5. In the preceding February occurred the remarkable day called still "the Cold Sunday" in America. This whole year was very sickly, and measles, fevers, and the cynanche trachealis were epidemic in succession. The small pox raged in Walthamstow, and the plague at Bassora on the Euphrates.
1774. *Comet* p. p. on the festival of the Assumption. Scarlatina anginosa epidemic in Edinburgh. The winter

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set in very severe with snow, but this happened only in particular veins or tracts of collateral tracts being under a mild air. This is an important fact, for it shows that epidemic poison moving in the air may obey similar laws, and more with wind in particular currents. 1775 an eruption in Guatemala. Death of oyster beds noted.

1777. Earthquake felt in England : sickly time followed.

1779. *Comet*, Jan. 4. Eruption of Vesuvius : earthquakes : very severe winter followed. Thermometer lower at Glasgow than ever before recorded. A very unhealthy period ; and it has been for some years.

1780. *Comet*, p. p. Sept. 30. The hybernal season. This year was cold. On St. Hilary's Day, Jan. 14, the thermometer, "according to Fahrenheit's scale, fell to 0—9 or 9° below 0, at Hartford, in America : it had been as low as 0—26° on the 11th. But I mention the 14th as a particular day, because it is the average coldest day of the year.* The thermometer fell at Glasgow, to 0—46°, a cold almost incredible for Scotland. At Walthamstow it was 17°, which is no great cold. The spring was cold, and the plague raged at Smyrna. In summer the "Breakbone Fever" raged in America. During the Festival of Guardian Angels, at the Leeward Islands, Oct. 2, a violent hurricane desolated the Leeward Islands, and on the 11th, the Windward Islands were laid waste. This, observe, was just after the perihelion of the comet. *Royston crows in great quantities, near London*, Jan. 15—T. F. F. *Field-fares numerous*—E. F. *Splendid Aurora Borealis at 10 p.m. in W. and E.* Friday, July 21—E. F. Snow in December.

1781. *Comet* July 7, and another *Comet* November 29. In

* It was on this day, in 1826, that the thermometer fell to the point of 0—10°, at Hartwell, near East Grinstead.

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spring prevailed the influenza in America, and next year in Europe. On the 15th of February, *remarkably red, white, and bright Aurora Borealis*. On the 17th, violent storm of thunder and hail—E. F. Remarkable Aurora again on the 27th of March. April 25, and on the feast of Our Lady of Mercy, Sept. 24, and the preceding day very bright. It is to be remarked that this time has always been celebrated for bright Auroras. Clouds of sand martins in London. Beetles and cockchafers this year were numerous; hornets in plenty, wasps few or none. *Halo round the moon and meteors*, Nov. 4—B. M. F. The Aurora continued the whole autumn more or less.

1782. Earthquake in Calabria, contemporary with great fall of barom. in Scotland, and famine. The autumn was very dry. There was a transit of Mercury on the 12th of November.

Early spring severely cold, with April floods. In March the memorable influenza prevailed all over Europe; in England its particular range was very easily to be traced; effects of this epidemic were sudden, and it was among the most recent striking proofs of the atmospherical nature of these peculiar morbidic stimuli. The epidemic assumed more of a violent nature towards May, and I find the following memorandum in a MS. Journal:—May 26. *The most universal prevalence of inflammatory disorders*.—Journal, E. F. It has been observed by those who advocate the opinion of cometary and planetary influence that though there was no comet this year on record, there were two late in 1781, and that the influenza began in that year in America, having a regular progress thence along the Pacific Ocean, avoiding Asia and Europe from the east, and passing through Siberia and Tartary to Western Europe, where it arrived in March, 1782, and pro-

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ceeding over France, England, and Germany, was in the course of the summer merged and lost in the approaching epidemic weatherbane of the following year.

1783. *Comet*, p. p. Nov. 15. We are now come to a year, remarkable in modern history for its atmospheric phenomena. On St. Agatha's Day, Feb. 5, in Sicily, a thick fog is recorded, overspreading the whole Island; a tremendous earthquake followed, burying above 30,000 in the ruins in Messina and Calabria, during which flames seemed to issue even from the sea. Four days afterwards a fog, having the smell of burnt leaves, spread over New England, the ground there being under snow. A famine in the Carnatic followed. On the night of the 29th of March, a splendid lumen boreale in America. In England it appeared Jan. 13, and in Feb. the marshes of the Lea were under water for 10 days. There was much mistiness, which began to overspread Europe in June, during the eruption of Hecla, and previous to it, Ireland was covered with blue vapour and the springs dried up. On the 31st May, a large meteor was seen in Virginia. On St. Helen's Day, Monday, 18th August, in England, was observed the great and memorable meteor, which crossed Europe from NNW. to SSE. blazing and leaving corruscations in its train. It was seen about half-past 8, by Mr. B. M. Forster, at Walthamstow, who was so amazed at its magnitude, that he jumped out of a window to observe it better from the garden, and he describes its course as attended with noise. The same year, in Oct. tremendous gales and high tides occurred. In some parts great rains fell, and in others earthquakes were felt. Great fog at Amsterdam in December. The disorders of health kept pace with these convulsions of nature. Dis-

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temper among cattle began in England at Derby. Greece, Smyrna, and the Crimea, were subject to the plague, and that disease produced the most dreadful ravages in Egypt, where it continued all the next year. In various parts of Europe and America the scarlatina and the measles were epidemic.

1784. *Comet*, in Pisces p. on St. Agnes Day, according to Mechain. The whole of the hybernal period was severe, the snow had set in as early as December, and the frost had been changed for flood about New Year's Tide, yet the former returned with snow, which did not melt till March, and these phenomena were cotemporary with the same weather in America, where, as well as in Europe, the rivers were frozen. On the 17th of January, just before the *Comet* was seen, an earthquake was felt, and a tempest and flood damaged the coast of France, Italy, and Spain, to a great extent. Another *Comet* passed its per. April 9, and was followed by eruption of Vesuvius. A hot summer followed, with an epidemic constitution of the air. July 30, hurricane in Jamaica, and on St. Catherine's Day, 25th November, a tempest and extraordinary tide at New York. Meteor, Dec. 13. This year aerostation, already begun in France, added a fresh instrument for meteorology in England.
1785. *Comet* January 27, and another *Comet* April 8. A dry hot summer, and fever prevalent. Canine madness epidemic in America;* and among men scarlatina; and a blight of the wheat insect. Hurricane in the West Indies August 25. On the 9th of August was the great tempest at Mantua, which was compared to Pharaoh's plague of hail.
1786. *Comet* July 7. Various small earthquakes in Britain.

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- The early part of the year was cold. Aurora Borealis April 29. Flood Nov. 5. Transit of Mercury May 4.
1787. *Comet* May 10. More healthy year than usual. Some fevers prevail sporadically in Europe. Aurora Borealis on St. Paul's Day. Swallows April 30.
1788. *Comet*, p. p. Nov. 10, and *Comet*, p. p. Nov. 20, two being seen at once, but telescopic. Influenza prevailed all over Europe the whole year; taking Vienna in May, London in June, Paris in August. The autumn was very tempestuous; and hurricanes in the West Indies. On the 17th of October a remarkable meteor at Connecticut.* In November the measles epidemic. Northern Lights February 11, April 1, and May 24.
1789. Singular Halo in Connecticut 28th of May. On the 27th there had been fine Auroras. A remarkable black spot was seen on the sun on the 9th of Nov. by Mr. B. M. Forster. Famine in America; and partially in France. Hydrophobia noticed. Earthquakes closed the year, and the plague at Smyrna. The winter 1789. 90 mild. Remarkable cloud, light, and storm, between 8 and 9 p.m. May 13th—B. M. F.
1790. *Comet*, Jan. 15.—*Comet*, Jan. 28.—*Comet*, May 21. These were small comets. Earthquakes in Africa. But this spring appears to have been rather healthy than otherwise. In April was a prodigious draught of shad fish at New York, which was said to forebode the pestilential fever which began in autumn. In 1791 earthquake felt at Lisbon: hot summer: topical fevers recorded. Plague in Egypt. Floating fog before Hampstead Hill, Jan. 7. Aurora Oct. 18, 1790.
1792. *Comet* p. Jan. 13. Scarlatina anginosa produced great mortality in America. In November earthquake felt in Perthshire. A comet is reported to have been seen in Jan. 1793, by M. Rettenhouse, in Cepheus?

* Courant, 1788.

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Mr. Webster mentions the wonderful cure of his children from scarlatina by change of air.*

1794. Malignant scarlatina in America at its crisis. The crops failed in England.

1795. *Comet*, Dec. 14. Great scarcity of bread in England. People used chestnuts and other things for flour. Coarse brown bread got into general use, and bread was made of potatoes and of rice: it was first felt in January. Vesuvius broke out in flames on the 15th of June. In America a species of headache with vertig became epidemic, and it also observed regular diurnal periods, beginning about eleven in the forenoon and going off by degrees after two o'clock, which was the time of its crisis. Neither bleeding, opiates, nor aperients, had effect on it, but in some cases a blister afforded relief if applied to the temples, the pain being local and below the coronal sutures.† Meteor before 9, p. m. towards the North, Sept. 9.

1796. *Comet*, April 2: during its approach to our system the measles became epidemic about London and other parts of England. My sister and myself being children, suffered severely from them in March. Between this period and 1800 the small pox broke out sporadically in various places, in others raged in an epidemical line of progression, and its terrors not being yet softened by vaccination, it occasioned repeated alarms in the country. The cholera infantum epidemic in America.

* Webster, i. 493.

† Many headaches begin in the morning, have their crises about two o'clock, and subside before six: see page 62. I have not usually found either bleeding or cathartics give immediate relief. Dr. J. C. Badeley has proposed the application of an ingenious compress, of his own invention, to be applied to the external temporal arteries, and this may afford relief where the pain is seated in the integuments: but in the majority of cases the pain is too deeply seated. The compress is used, I understand, in some of the hospitals, in cases of arteriotomy.

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1797. *Comet*, p. p. April 4, and *Comet* July 9, both telescopic. The hydrophobia epidemic in Rhode Island. Catarrh in England in spring.
1798. *Comet*, December 31, telescopic. Catarrhal fevers were general in America in spring, followed in summer by yellow fever and by pestilence of various types. Plague in New York? A severe winter followed; a fine summer and autumn.
1799. *Comet*, Sept. 7, and another *Comet* December 25. The former of these was visible without a glass, I remember its appearance early in autumn. In America the yellow fever of last year prevailed again. Storm of wind February 11. Severe winter and early.
1800. The year 1800 in England was healthy, though the summer was hot and dry; I find no comet recorded. Epidemic catarrh in winter. Violent storm of wind November 9. Tree in Selwyn's avenue blown down. Chimneys at Hackney blown down. Floods in Lea marshes at Martimas.
1801. *Comet*, August 8. July was not very healthy. 1802 healthy. The influenza as a violent epidemic catarrh prevailed in February and March: my father suffered severely from it, but refused medical aid, as he had never any faith in medicines, trusting to natural change of air. Much flood in Dec. Snow fell early in Nov.; much in winter.
1802. Rather healthy summer; some typhus in winter. Aurora Borealis Sept. 3.
1803. *Comet*, September 9. The year was rather healthy. Typhus fever sporadic in spring, and again in winter. Great meteor on Sunday, 13th Nov. at 8 p.m.
1804. *Comet*, Sept. 13. Typhus fever prevails? Northern Lights on St. Cecily's Day.
1805. *Comet*, November 18, and *Comet* December 31. Summer cool; autumn warm. On Sunday, the 11th

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August, a curious vortex, like a vapour, on elm trees, which turned out to be insects.* The season rather healthy till end of winter, when an unhealthy time began with various forms of fever in Europe. The summer and autumn had been fine.

1806. Comet? Tolerably healthy after the spring, which was very sickly with colds, &c. I shall be now more brief in my notes, as the Journal from this period has been published already by me in my Book on Atmospheric Phenomena, 3rd edit. 8vo. London, 1823. Very temperate summer.
1807. Comet, p. p. September 18. Eclipse November 14. Agues in Essex in winter very prevalent?
1808. Comet? This was a late spring and cool summer. Much catarrh prevails in winter. In May the lambent electric light on plants at night.
1809. Comet? Much catarrh in winter. The corn fields strewed by tempests in Sept. in the North.
1810. Comet? In autumn prevailed a bilious epidemic with hypochondriasis: the whole summer had been unhealthy, and the atmospherical electrometers had indicated a peculiar fluctuation of the electricity of the air. The clouds exhibited all the year the most whimsical and grotesque figures, and my aerostatic experiments showed various currents at once.
1811. Comet, with very brilliant tail, the largest seen for many years. p. p. September. See my Journal for that month in *Atmos. Phenom.* This Comet was visible to accurate observers from May 1811 to July 1812. Fever prevailed in many places. Electricity disturbed, and clouds had very strange shapes. Pestilence in the South of Europe and Asia? Another Comet is recorded, but it was telescopic.
1812. A more healthy time prevailed in England.

* See *Gent. Mag.* Oct. 1, 1805, p. 816, and *Athnos. Phenom.*

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1813. *Comet*, p. p. May 19. Healthy solstitial season : slight fevers in winter. Very fine weather this year.
1814. *Comet*? On the whole the weather has become more healthy again. Some local epidemics.
1815. *Comet*? Abilious hypochondriasis in July and August. Healthy autumn. This year was remarkable for seasonable weather throughout.
1816. *Comet*? Typhus in Scotland, but not general. Some very singular local epidemics in England in spring, which was late, followed by a very showery summer.
1817. *Comet*? Earthquake in Scotland : fevers of low kinds prevail. Abundance of showers in summer. Fine autumn.
1818. *Comet*? Canine hydrophobia. Pestilence on the Continent. Hot dry summer and autumn. Abundance of mushrooms and funguses.
1819. *Comet*, p. p. June 28? I discovered this *Comet* by accident on the night of July the 3d, being at Hartfield, Sussex ; it had a very long and divided tail. Fever prevailed as an epidemic in various parts of Europe. Typhus in Ireland. Small pox followed in winter, and in January next year. The summer was hot and rather dry.
1820. Extraordinary eclipse of the sun September 7. An unhealthy hybernal season, with typhoid fever in spring : summer healthy. During the eclipse the cocks began to crow, as at morning cockshout.
1821. *Comet* seen all January, p. p. March 21, very small. Fever began in Spain and Portugal early next winter. The spring had been unhealthy, with typhus mitior, followed by boils and carbuncles. Prodigious quantity of wasps and hornets in autumn.
1822. *Comet*. Fever in the Peninsula occasioned the

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cordon sanitaire of the French army along the Pyrennees. Slighter fevers appeared as epidemics in various parts of the French and English coast. Epidemic croup in France. Hydrophobia in Holland. Thunderstorms prevalent in summer.

1823. Comet? Some prevailing fevers in spring. A wet summer, but fine dry autumn.
1824. Occultation of Uranus August 6. A showery summer with intermittents.
1825. Comet in September, conspicuous all October. Sickly time in July, and again in October. Hot weather in summer; cold in winter.
1826. Comet in *Bootes*: it crossed the sun's disk, Nov. 26. The Comet of March 19, the same as app. in 1772 and 1805. Hot solstice.
1827. Comet? Generally speaking a healthy year. Moderately warm summer and winter.
1828. Comet, called Encke's Comet, still to be seen; it began to approach our orbit in autumn. On Sept. 29 the remarkable Zodiacal Light was seen, of which an account will be found in the *Essex Herald* and *Chelmsford Chronicle*. About the same time, the pestilential fever broke out at Gibraltar, and soon afterwards lesser epidemics appeared at Cadiz, at Paris, at Edinburgh, and other places in the outskirts of the central fever, which still prevail. See *Lancet* for December, 1828, and January, 1829. Intermittents had prevailed everywhere last winter and early in this spring in Europe.
1829. I have thus brought the catalogue up to the beginning of the present year. We have still the remains of the Gibraltar fever, and the epidemics in regions situated in its periphery.

The great Comet, called Halley's, which will appear in 1833 and 1834, is now expected with great additional interest, not only from its having appeared so often before,

but from its appearance having been accompanied with some remarkable volcanic and atmospherical commotions, and with great pestilence. Whether this was the effect of accidental coincidence, or of some natural connection, remains still in doubt, and will receive additional illustration by the sort of phenomena which may be found to attend its re-appearance. It appeared before in the years 1456, 1607, 1682, and 1759, having been once missed or not noticed, namely, in 1531, when it ought, according to calculation, to have been observed.

It is recorded that about 500 Comets have appeared since the Christian era, and above 100 are noticed before it. No doubt many small ones have at all periods passed unnoticed, and others have escaped observation from their position. It is certain that the most unhealthy periods have been those when comets of some size have appeared, and they have been accompanied by earthquakes, volcanos, and atmospherical commotions; while healthy periods have been those when none of these phenomena have occurred. I have made out the above catalogue from curiosity, and with a desire to see if possible how far the opinion of the antients, and of Meade, Sydenham, and Webster, among the moderns, respecting the influence of these phenomena, might be found correct: and though I am by no means prepared to make any positive assertion on the subject, yet no one who dispassionately compares facts, can I think deny the coincidence to which I have alluded, however much he may doubt any theory of causation founded thereon. At all events I have established it as certain that epidemics depend immediately on atmospherical causes, whatever may be their remote origin, and have confuted, I trust, the idle tales about contagion being the source of pestilence, which seem calculated to produce mischief by leading to erroneous and oftentimes to unjust modes of practise.

I shall now pass on to a more impartial consideration of the treatment of epidemics, and of the best^o manner of guarding against their effects.

CHAPTER VI.

ENUMERATION OF THE CHARACTERISTIC FEATURES AND
EFFECTS OF EPIDEMIA.

UNDER all the variety of forms that diseases, produced by atmospherical causes, assume, one general effect may be observed, namely, a combination of irritation and debility; hence it results that the antidote sought for, as far as diet and medicine are concerned, must be such as tend to strengthen and tranquillize the constitution. This observation tends to show, in the first place, that the salutary rules of health recommended in other cases, apply also to atmospherical diseases: it shows also that habits of life that uphold strength and tranquillity of constitution, in general, are likewise capable of granting an exemption against pestilential disorders in particular. But the strength of constitution alluded to, is not mere muscular force, which is often kept up by artificial means, by rich food, and by all the arts of training. This sort of forced strength, produced as it is by what Mr. Hunter used to call living above par, is necessarily of short duration; for the susceptibility varying inversely as the application of the stimulus, by an invariable law of the animal economy, the high state of animal health is sooner or later sapped by the exhaustion of susceptibility, and disease and death follow. Thus athletics, who live high, and the over fed and luxurious in general, often die suddenly, or are the first to be carried off by the occurrence of epidemic pestilence. The next class of persons attacked are those who live too poorly, or rather those whose poor living consists partly of a diet of bad unwholesome food, as pork, salted meats, and decaying vegetable matter. I have already explained that the true health which guarantees the subject against epidemia, and conduces to comfortable longevity, is the available

strength possessed in reserve resulting from wholesome diet and air, regularity of hours, temperance, and those periodical fasts and abstinences which have a tendency, according to the law of animality already described, to regenerate the vital power by the help of intervals of abstraction from ordinary stimulus, and which, under some form or other, have been practised by nearly all nations, antient and modern, though by no one, with so much judgment and effect, as by the members of Christian communities.

But this subject requires a more particular consideration, and will be reserved for another place; I shall, therefore, now recapitulate some of those facts in the history of epidemics that have been before alluded to, which will amount to an imperfect enumeration of their phenomena, and show in what measure they may be guarded against. I shall then proceed to some important observations on the maintenance of that general health and strength of body by which this desirable object is to be achieved.

Epidemia may be defined an unhealthy condition of the atmosphere for the time being, which consists in its specific power to irritate and debilitate the living animal machine. It arises, at uncertain periods, from unknown causes, in almost every part of the world, prevails for a time, and subsides. It varies at different times in its own specific exciting power, while its effects are still further modified by the fluctuating habits of life in artificial society, and the consequent variety in the predisponent causes of diseases. It is also more or less virulent in different climates, times, and seasons, and has, like many of the diseases it excites, a beginning, a crisis, and a period of decline. Thus an epidemic constitution, in a particular country, will begin by producing a prevalent catarrh, or influenza, then a spotted fever, or measles, and lastly, a plague, while even in this last stage, the slighter diseases still prevail in the outskirts, of which history has recorded hundreds of examples; as if the morbid stimulus accumulated and varied with the progress of the epidemic state of the air. Its attacks are sudden and unexpected; and on the

constitution it produces, being an atmospherical excitant in itself ever varying as a cause, a still further variety of effects, according to the climate, soil, or season in which it occurs, and the particular predisposition of the individual whom it attacks. It affects the young, the old, the ill, and the well, making invalids of the healthy, and modifying the complaints of those already ailing : it attacks animals, birds, insects, and even fish in ponds, but particularly domestic animals ; neither do plants escape its destructive ravages. But whether men or other animals be the subjects of this grand scourge of life, those who have the most available health or latent power of constitution, are the most exempt from its attacks, and such are at all times the persons who, during the more terrible forms of its pestilential visitations, outlive or escape its fury, and prevent the completion of its depopulating tendency. Its more violent forms appear in plagues, epizoties, and famine conjoined, of which history is full of examples, and against which Medicine has tried her skill, Philosophy made her experiments, and Piety put up her prayers. Its milder features are discerned in low fevers, catarrhs, anginas, and all that numerous train of minor complaints which, various as the ever changing shades of light and combinations of colour, arise when least anticipated and, in spite of precautions and of care, make man feel the penalty of Adam, and serve to convince him, by terrible mementos, of the frail and uncertain condition of mortality.

Such in effect is epidemia, and though its remote causes lie hid in the unexplored regions of space, yet its evident connection with varieties in the operation of the electric fluid, in our own atmosphere, may be fairly inferred from facts, of which the following is a short and conclusive enumeration. Epidemics, particularly the most widely extended and terrible kinds, have generally been preceded, as I have repeatedly shown, by the unusual prevalence of fiery meteors, by earthquakes, northern lights ; and other electrical phenomena in the air which envelopes the earth, and by comets and unusual aspects of planets and often eclipses, in the higher

regions above. They more frequently set in with electrical changes of weather about the periods of new or full moon than at other times ; while at these lunar periods the disorders themselves, of the individual patients, already produced by the air, have usually their crises. Epidemics, too, more often occur with east wind than with any other, and often follow its course. They avoid the long continued electric cold and dry air of the higher latitudes, in wholesome polar winters, and most abound where marsh effluvia, moisture from waters, and other causes, aid the communication of the electric fluid, and perhaps vitiate its nature, by converting dry air, naturally an electric, into an imperfect conductor, by the suffusion of vapours. Lastly, my own experiments with atmospherical electrometers tend directly to show that healthy times are those in which the air is highly, and perhaps positively, electrified, while unhealthy periods have been accompanied by a comparatively non electric state of the air, or by an unusual disturbance in its electricity. The headache and other pains, felt by some persons, at the approach or in the vicinity of thunder storms, when under the alternating portions or circles of non electric air ; while others, over whose heads the storm breaks, and lets down its electrified waters, are relieved, are facts which strongly prove what has been advanced.

Under an impression that partial abstractions of the natural quantity of electricity in our bodies from, the above causes, might be the particular cause of the effects enumerated, and with the knowledge of the new experiments in electrochymistry and animal galvanism to guide me, I instituted various experiments to try if the production of artificial electricity could supply the place of the natural ; but this I found could hardly be done, from its transitory effects. Future experiments, and I have much curious matter in reserve on this subject, may throw more light on the means of employing electricity as a medical agent, in epidemia. For the present, I shall dismiss the subject, and proceed to a short description of the mode of treatment, and of those salutary

habits of life, and simple medicines, by the due employment of which we may guard, in a great degree, against the actual occurrence of pestilence and the ordinary disorders of life ; and may give to our bodies severally, in proportion to the native soundness of each, the greatest share of strength to combat the vicissitudes of the seasons and the uncertain changes of the weather, and shall consequently confer on ourselves the greatest chance of arriving at a tranquil and healthy old age.

§ 2.—*Of the Method of Treatment of Epidemical and other Fevers.*

As it is not the object of this work to describe the varieties of practice adopted in fevers, nor to particularise the various modes of treatment which may in particular instances be indicated by circumstances, so I shall content myself with stating as briefly as possible what plan appears, from observation, experience, and analogy, to be the best. I believe with very few exceptions the depletory, or what is technically called the antiphlogistic system, is that which is not only the most successful, but is by much the safest. It may be considered as the powerful and sudden application of the same means of relief, which are afforded in a slower and less artificial manner by abstinence ; and it is a practice in harmony with the well known fact that those who live temperately, employ periodical abstinence, and have recourse to the occasional use of alterative and aperient medicines, are infinitely less liable to the incursion of febrile diseases than others who follow an opposite course of conduct. I have adopted this practice in fevers with success, I have made successful trials of it in my own person, I have examined the practice of the ancients, and have compared that of physicians in different countries, and I am convinced that whatever medicine and regimen can do towards the cure not only of febrile and inflammatory complaints, but of a numerous train of others less *obviously* produced by encrease,

arterial action, is to be achieved by alteratives, and by depletion, well timed and proportioned to the strength and habits of the patient, and the urgency of the symptoms. There are, doubtless, many forms of disorders, as, for example, intermittents, which are *relieved* by the stimulus of cinchona and some similar substances; nor are exercise and agreeable diversion of mind without their due influence. But these remedies will only act, if I may use such a phrase, *pro tempore*, on the predisponent of the disease, and subdue the violence of the symptoms: in many cases it remains for depletion and change of air alone to effect the permanent cure, by removing from the patient the exciting and predisponent causes.

This is in a great measure what ought to be the almost universal practice whenever it can be achieved. For though I would not recommend severe or painful fasting, yet if I were asked to state in terms as popular and general as possible what practice was, with a few exceptions, the best, on the occurrence of nine epidemic diseases out of ten, I should say—open the bowels freely with mild calomel and aloëtic purgatives, rectify whatever natural functions seem depraved by the simplest medicines, and then, prescribing a light nutritive but unstimulating diet, order the patient to change the air, by removing to a situation as far out of the course of the prevailing weather as possible.* More than this usually comes of quackery; and the doctrine of nostrums and specifics is too often supported, in order to become, in turn, the support of those who uphold it. I do not intend hereby to discourage the use of specific medicines, in cases of peculiar diseases, where experiment forms the grounds of their employment. Particular cases will, of course, arise,

* This might be easily practised at sea, when a ship's company had got an epidemic, when she was going before the wind, by tacking and running with the wind a beam, at right angles, or nearly so, to the current, till she got into another eddy. Some time might be lost, but some health might be gained by this plan, where there was expanse of ocean enough to put it in execution.

demanding particular treatment:—idiosyncrasies of constitution, climate, season, age, sex, and various other things, will now and then require various practice, and justify enterprise in the trial of new medicines, but in general this sort of tampering with the constitution is too much resorted to, while well tried, simple, and therefore *safe* remedies, are neglected. Of the efficacy of the antiphlogistic plan in fever I am perfectly convinced; and its utility is further proved by the fact that those who habitually live in conformity to such practice are less liable to disease than others. I shall, in the next chapter, endeavour to lay down such rules as may enable all persons to live in comparative security from the incursions of disease; and shall conclude this, by an enumeration of some cases which tend to show that, after all, the greatest medical agent which we can rely on, in epidemics is change of air. And I have the satisfaction to perceive also that the facts which prove the truth of this part of my argument, comprehend abundant evidence of the counterpart, which pleads the cause of temperance and urges the condemnation of luxury.

In the case of the present fever at Gibraltar, various remedies were tried in succession without much avail, and the disease at length yielding to a natural change in the constitution of the air, the last remedy employed was believed to be the successful one. This is what often happens in private practice; several physicians are tried one after another in succession, for an obstinate disease: each, as usual, employs some different remedy, the complaint goes on for a time, and during the attendance of the last medical man employed, a change takes place in the weather, when the patient regains his health, and his attendant gets the credit of it. I am convinced that I have seen this happen in cases where the most opposite medicines had been tried by turns, but where health would have returned quite as soon, if no medicines had been employed at all, except perhaps such as immediately relieved urgent and dangerous symptoms.

Another case of deception ought here to be mentioned, as it might have led to errors in practice of great consequence if not properly explained. A patient labouring under a low and febrile complaint, with disordered digestive organs and deranged biliary secretion, applied to me for relief. I found that his constitution had been much exhausted by spirituous liquors, by stimulating food, and by debauchery. If I had given him tonics and suffered him to proceed in his habits of high living, a temporary but deceptive health might have ensued from a further augmentation of stimulus, but in the event, the susceptibility being exhausted, death would have followed. I proceeded on the safer plan of lowering his diet, and giving mild mercurial aperients, by which combination, the susceptibility was encreased as stimulus was abstracted, and the natural secretions were restored as the medicine took effect. He felt, however, for the time, low and dejected: and then, having recourse to a better diet, his strength and health returned. Now he attributed to his return to good living what I knew to be the upshot of the previous course which I had put him on; which had prepared the constitution for the change: and believing that the additional nourishment had been the cause of his health, he persevered in it, and became worse than ever. It is a very common error to look no farther than the *last* link in a chain of causes whereby an effect is produced; and in cases of disease, it is often a fatal one. The ancients seem to have been better acquainted with that law in the animal economy to which I have before adverted, for they began in cases of disease or pestilence by a fast, in order to prepare for whatever remedies might be subsequently found to be advisable; and having then prepared the constitution by operating medicinally on the predisponent, they proceeded to remove the patient out of the exciting source of the disorder, by changing his situation.

It is a fact, of which I have had abundant evidence, that in the Levant, and in many countries of Asia, the Moham-medan population suffer much less than the Christian, from

pestilence, in any epidemic period ; and this arises from the former entertaining more the rational notions of the source of the disease, as well as from their comparative abstinence, and the rejection of wine and pork : their habit of smoking tobacco is also salutary. The calamitous consequences of the fear of contagion have often been severely felt in Turkey among the resident Christians.

Epidemia sometimes weeds the redundant population of India, but in nothing like the proportion nor frequency with which it desolates Europe ; on account of the vegetable diet and other habits of the Gentoo and Hindoo nations.

By numerous histories of pestilence, now before me, I find that persons who had left the focus of the epidemic, and changed the air, even in company with their infected relatives, did not catch the disease ; while others, who had stayed behind, incurred it in spite of every precaution.

When a pestilential air has overspread a country, and devastated its cities and villages, it has frequently left the monasteries untouched ; owing to the twofold cause, that the inhabitants have lived by rule of abstinence, and have also avoided, in a great measure, exposure to the air. The same thing has happened even in gaols, where the confined and crowded rooms would afford a powerful adjunct cause of disease, from their malaria.

Persons have been cured by removal to the leeward side of mountains, of rocks, and of their own houses.

When Europeans first remove to tropical climes, particularly to certain unhealthy parts of Africa, exposure is the principal cause why they get the fevers, particularly exposure to the evening air ; but it is also found that a more austere temperance, and feeding on fruit, instead of European diet, is also a great preventive ; and this applies to intermittents as well as to continued inflammatory fevers, and indeed to almost every sort of disorder brought on by change of climate. Habit, the fond handmaid and conciliatrix of Nature, has never been able to reconcile long and secure life with luxury, nor to enable the body to weather

the tempest of pestilence, on a full diet and the use of strong drinks.

The Prophet of Mecca has done well to forbid the use of wine and pork, and to prescribe fasts and ablutions; as is proved by facts before stated; and I have numerous cases recorded of persons who from adopting a Turkish diet on removing to the Levant, and habitually changing their quarters whenever it was possible, who have not only lived securely through pestilential seasons, but have attended on the subjects of the plague with impunity.

Egypt, as well as the Levant, is particularly subject to the true plague, from local causes; but these cannot consist in the swamps, in the effluvia from water, and so on, for other countries similarly situated are not often visited by the same disease. The principal cause lies hid in the changes of the atmosphere which surrounds our globe, and is as much a mystery as the origin and formation of the great and peculiarly compounded lunar stones, or of any other meteorolite. What confirms the fact more strongly than any other, is the history and range of the disease, when it pays occasional and destructive visits, always attended by other rare phenomena, to countries in common quite free from its incursions. It has been questioned whether London, with its improvements in expansion, ventilation, and cleanliness, is now liable to be visited again by the plague? I believe less so than formerly; not so much from ventilation, as because people live less grossly, and eat more vegetable matter than they did in former times; but there is, nevertheless, no doubt but that when the epidemic air shall spread again in the same range as it did then, we may again find ourselves surprised in the North of Europe by the plague. Kepler, notwithstanding his learning and science, believed that comets brought civil, as well as atmospheric commotions, by disturbing the animal frame. This is, perhaps, going too far; but if comets do disturb the atmosphere and produce volcanos which, by their fumes and vapours, pestify the air, we may

have something of the kind again, should Halley's great comet return in 1833. The misfortune is, that all rational views of these subjects have been so merged in superstitious ideas of astrology and augury, that they have fallen into discredit, as it were, from bad company. That the position of the rings of Saturn, the belts of Jupiter, or the satellites of Uranus, much less the coincidence of any of these with eclipses, should influence the lot of mortals in the way astrologers pretend, is utterly absurd. At the same time, the powerful influence of the moon on the tides and on the weather, and the coincidence of comets with volcanos and other sources of corrupt atmospheres, are just objects of medical speculation, as well as of natural curiosity; and if men had confined their enquiries to facts and real comparisons, instead of launching into vain hypotheses on the one hand, and rejecting every thing which, at first, seems mysterious on the other, we should before now have had a better system of meteorology, and consequently a more comprehensive knowledge of the source of epidemic diseases.

The treatment, however, must not be founded on any speculative notions, but on experience alone; and it is fortunate, among the numerous nostrummongers and empyrics of the present day, to be able to expose their pretensions and disarm them of their poisonous weapons, by confronting the various and contradictory practices recorded in history, and thence proving how little Nature has been affected in her course, by the interruptions of a thousand incongruous panaceas. Meanwhile the physician, who studies her laws with advantage, will confine his practice to such means as experience alone has proved to be capable of affording her assistance; by removing functional obstructions and facilitating the developement of the restorative principle, which for a certain term is inherent in the animal machine, as a provision against the morbid excitement of epidemia, as well as against the numerous injuries which luxury and art are always doing to the body in civilized life, and thus predisposing it for the more formidable manifestation of disease.

CHAPTER VII

RULES OF HEALTH.

I SHALL take the liberty in this chapter of introducing some rules of health and descriptions of the organs and physiology of digestion which I wrote many years ago when a pupil at St. Bartholomew's hospital ; because subsequent experience has proved that, making allowance for a few peculiar cases of exception, they will be found capable of establishing and maintaining a strong and lasting condition of the body ; of guarding best against the incursion of pestilence, which is always a possible occurrence ; and thus of enabling individuals to do the most towards preserving their faculties unimpaired to the last.

§ 1.—*Preliminary Argument that the Temperate and the Healthy are not much affected by prevalent Diseases--Power of the Human Constitution to adapt itself to Changes, when fortified by Temperance.*

Previous to laying down rules of health, it may be as well to show that they are available in the prevention of diseases. Now history incontestibly proves that not only in less virulent epidemics, but even in the more violent plagues, when the epidemic constitution of the air has been at its acmé, certain persons have totally escaped its attacks ; and these have been the temperate and regular, who have that sort of secure and tranquil health in store, which is called stamina, from its being capable of bearing up against the incursions of disease. This sort of real soundness of constitution, the invariable result of due temperance, exercise, and regularity, is essentially different, both from the high florid but uncertain and artificial health which comes of repletion, on the one hand, and the weakness and debility

of an impoverished habit of body, resulting from debauchery and filth, and bad food on the other. This distinction, if duly weighed, will explain what at first sight appears to be an incongruity in the effects of a prevalent epidemic. We find that out of a number of persons exposed, those who live high, eating intemperately, and drinking spirituous liquors, and particularly those who *have long so lived*, are the earliest victims of pestilence, and while we are hastily ascribing their disorders to intemperance, we find another class of persons attacked who perhaps were living low, and had poor and weakened constitutions ; at the same time we find a certain class escaped. On a more minute enquiry, we shall find the poor beings in question to have been persons whose susceptibility was exhausted by former bad habits, or whose natural constitution was weak. For it is the tendency of high feeding to afford a specious health for the time being, and to lead to subsequent infirmity. Hence it happens that many who escape the tread of fortune in the days of youthful debauch, have little cause to rejoice at her favours, as they sooner or later encounter the more torturing scourge of Febris on the occurrence of epidemics ; and if they have stamina enough with care to get over the trial, it is only to await the lingering progress of a living death in a constitution no longer capable of being upheld by the stimulus of natural food.

The persons whose health enables them to resist the effects of disease are those *who have been temperate for a length of time*. In times of certain sorts of pestilence, a little additional stimulus may be necessary, but it cannot be too often repeated, that it is the *previous* habits of the individuals which lay the foundation of their power to repel diseases. Numerous instances of what I have been stating have occurred during the spread of epidemical pestilence in Europe, Asia, and in America. I could cite cases in point, which were collected during the yellow fever in New York and in the West Indies, and also, during the time of the plague in Italy, in Turkey, and in the more temperate parts

of Europe. In the greatest pestilences, even in those wherein cattle suffered, some individuals remained quite free from the disease, and even among beasts the more domesticated and best fed fell the soonest. I shall close this section with reminding the reader of a fact, which is disgraceful to our profession, that in times of pestilence, the catholic priests have often supplied the place of the terrified physicians, and have visited infected patients, with a degree of impunity that, making all allowances for the power of mind over body in the consciousness of good actions, must be in a great measure attributed to those abstemious habits which the church enjoins, and which were more strictly observed in the early ages of Christianity.

I am persuaded that a careful examination of facts, in almost every part of the world, would prove the truth of the doctrine which I have advanced. In all climates animal life obeys the same general laws, however circumstances of temperature, of seasons, and of hereditary varieties of constitution, may vary their particular application. Temperance, modified according to the climate and the habits of the people, is every where the tenure on which man holds his health. Temperance allows a vast variety of foods, provided they be eaten in moderation, and the health which follows refuses no habitable situation on the globe: the flock of Hygeia is widely dispersed over the earth's surface, and fortified by the observance of her rules, we may traverse the frozen mountains of polar ice, or bask in the warm valleys which lie along the sun's path: we may brave vicissitudes of heat and cold, and cross and recross the equator from arctic to antarctic snows, or ramble along an isothermal line as necessity or choice may direct. Neither need we fear pestilence, but may visit hospitals and pesthouses with impunity. We may likewise eat of all the ordinary aliments in the countries where we sojourn, observing only where any thing in particular disagrees to avoid it, and to adapt our food to the want and our labour to the strength of our bodies.

It seems almost necessary that those who have the means of living as they please, and before whom the luxuries of the table are daily spread out, should live in a manner by rule, or at least that they should practise abstemiousness occasionally; there being always a tendency to eat more than the system really wants. It is remarkable that St. Ignatius of Loyola, whose mind was so perpetually intent on the spiritual welfare of his followers, and on plans of reforming the moral world, should have also laid down some of the best physical rules for the regulation of health. He is said when he founded his Institute, to have called together a council of physicians, and to have examined them carefully before he formed his rules, for the regulation of diet, as well as of hours of rest, religious exercise, and other ordinances; and that it is from this circumstance that the rules are so calculated to promote health of body as well as tranquillity and power of mind. The hardships and severe trials which his followers have suffered with impunity, in every part of the world, and at times under circumstances the most appalling, testify to the truth of my observation, and tend to prove that social man is calculated to live by rule; and that health, as well as spiritual labour, is beneficially economized by the periodical employment of our fleeting hours, and a judicious regulation of times and seasons, whenever circumstances will admit of it; where the contrary is the case, as in travelling, we should still approximate as nearly as possible to habitual rules, taking however care never to become bigotted to them when prudence or duty call on us to adapt our conduct to present circumstances. In voyage and travel we cannot always eat of our accustomed diet, nor dine at our usual hours, but we may contrive to observe, nevertheless, the laws of temperance, and avoid what is known to be hurtful. To live habitually on a small quantity of food will give the system great power over disease when it occurs, and enable us by a very small addition to our food, when necessary, to repair the ravages of disease. People fall into an error

respecting diet in fever, which is natural, but at the same time so dangerous, that it deserves particular consideration. When the constitution has been debilitated by disease, or exhausted by fatigue, I have seen people actually persuade the sufferer to take nutritive and stimulating things, and that too even against his appetite. Such practices greatly aggravate the disorder and produce further weakness by exhausting the remaining excitability ; whereas the practice should be to give but little food, and that by degrees, and at regular intervals of six hours at least, so as to allow the enfeebled stomach to recover its digestive power between the meals, which it can only do by rest, good air, and the excitement of cheerful ideas after eating : and that food should be selected which agrees best with the individual. It was an excellent saying of Lessius, in his *Hygiasticon*, “*Non enim multitudo ciborum et delicie naturam debilem corroborant, sed modica quantitas cibibus respondens et qualitas temperamento conveniens.*”

§ 3.—*Description of the Digestive Organs, and general View of their Functions in the opposite States of Health, and of Disease.*

As no one can understand the morbid changes of structure which organs undergo, unless he be previously acquainted with the anatomy of the organs, so likewise is it impossible to comprehend clearly the disordered actions of any part, or organ, unless their natural functions be already known and understood. It is with a view therefore of preparing the general reader for the history of indigestion, and its direful consequences, that I have thought proper to begin with some short and preliminary account of the situation and functions of the different organs concerned in the work of digestion when in a healthy state. The reader will then see how many different processes the food we take undergoes, in order to become so assimilated as to be nutritive, and capable of repairing the daily waste of the body.

* Lessius Hyg. seu Vera. Ratio. Valetud. *Antwerp, 1614.

Each of these several processes may go on imperfectly owing to the state of their respective organs, and hence the knowledge of the various causes and consequence of bad digestion must be considered as by no means so simple a thing, or so easily acquired, as many people imagine it to be. Besides which the disorders of one organ affect the others by sympathy, and thereby may produce a complexity of evil effects. Lastly, the epidemic stimulus from without, when it acts on the digestive organs, may on different occasions make selections according to its own peculiarities, whereby some organs may be affected, while others remain tolerably healthy.

The stomach is the first of the digestive viscera which claims our attention, the food being received into it immediately on being swallowed: it may be considered as the expansion of the throat into a large cavity or bag, the lower end of which contracting again terminates in the intestinal canal. A more particular and anatomical description of the stomach is not necessary for the general reader: it will be sufficient to observe that it is in the stomach that the first process of digestion takes place, the food being therein converted into a viscid semitransparent fluid, commonly called chyme, and that this is effected by means of the gastric juice, a secretion poured into the cavity of the stomach by secreting vessels situated in its coats, and which are excited to perform their proper functions by the stimulus of the food which has been swallowed.

The stomach is the seat of the sensation of hunger, which in a state of health may be regarded as the general criterion of the power of this organ to digest our food. If we eat when we are not hungry, or if we take in substances not sufficiently stimulating or adapted to the feelings and wants of the stomach, indigestion is the natural consequence the secreting vessels not performing their functions, and the food, remaining in the sac of the stomach nearly in the state in which it was swallowed, occasions uncomfortable sensations, and after a time passes in a crude or undigested state

into the intestines, in which it frequently occasions colic and other painful feelings, and by sympathy, pain in the head, or other parts.

Thus the grand object, as far as the stomach be concerned, is to insure a perfect digestion of the food, which is, in other words, to secure its conversion into good chyme. And this is to be done only by adapting the quantity and quality of food, and the periods of our meals, to the natural wants of the animal machine. Of these three things it will be necessary to treat separately by and by. I shall at present go on to speak of the subsequent changes which take place in the intestines.

The food having been changed into chyme in the stomach, passes through the pyloric orifice of this organ into the duodenum, the first of the intestines, where, as soon as it has arrived, it undergoes another change, namely, its conversion into chyle, a substance differing from chyme, being of a whitish colour, and somewhat resembling thick milk. This change is effected by means of the juices secreted into the duodenum from three different sources; firstly, the coats of the intestines themselves secrete a clear juice into its cavity; secondly, a large viscus called the pancreas, which has a direct opening into the duodenum, secretes its proper fluid; and, lastly, the common duct from the liver and gall bladder, pours the bile into it,—and these three mixing with the chyme, seem to be instrumental in its conversion into the chyle above spoken of.

This chyle carried down the whole canal of the intestines by their vermicular motion, is in the course of its progress absorbed by numerous lacteal vessels, and by a long and circuitous process is at length carried through the thoracic duct into the vein, and ultimately into the right auricle of the heart. By the heart it is converted into blood, which receives its fine red colour in consequence of its exposure to atmospheric air in the lungs. For the heart first sends the blood into the lungs, then receives it into its own cavities again, and lastly distributes it all over the body by forcing

it into the arteries. The arteries end in veins and in secreting vessels, and the veins carrying some of the blood back again into the heart, the motion of the blood is styled circulation: But it is not the whole of the chyle that is thus drank up out of the intestines by the lacteal absorbents and carried into the circulation: for only a certain portion of it being fit for nourishment, the residue is converted, in the lower intestines, into feces and expelled.

Thus then I may observe that in the stomach the food is digested—a term now generally used for this first process of assimilation which our nutriment undergoes, but which is more properly called chymification. However as digestion is the term now usually confined to this process, I shall use it for such throughout these sheets. Indigestion is therefore to be understood as the imperfect or faulty performance of this function. And when I speak of the defective performance of the subsequent functions in the small intestines, I call it bad chyfication or the imperfect conversion of the chyme into chyle. However the employment of medical terms should be avoided as much as possible, for the same reason that I have omitted particular anatomical descriptions, namely, that they will only perplex the general reader, who may be ignorant of anatomy, and will be superfluous to the profession, who are, presumed at least to be, already well acquainted with that science.

I may now proceed to the organ intended to secrete the bile, and to pour it into the duodenum or first small intestines, by means of its ducts. The liver is the largest organ in the body, and occupies a considerable space in the abdomen—its general use as a preparer of the bile is well known. The Greeks called it *ἥπαρ*, and the Romans *Jecur*, and consequently the adjectives hepatic and jecoral apply to this viscus. The liver separates the bile from the blood, and it may here be observed in general that all the secreting organs derive their peculiar secretions from the blood, however much their peculiar fluids may differ from each other.

The pancreas for example secretes a clear diluting fluid, while the liver secretes the yellow bile, nevertheless both come from the blood; their differences seeming to depend on the natural powers of their respective secreting organs. The same argument holds good with respect to tears, mucus, urine, and indeed to all the secretions, as well as to the substances which composed the body, as muscle, cellular membrane, fat, bone, and so on, all which are separated by peculiar organs from the blood, and deposited in their proper places to replenish the daily waste of the animal machine.

There is an organ about the stomach, of which I have not spoken; I mean the spleen, the particular use of which is not clearly ascertained, for it has no duct opening into the alimentary canal: it has arteries and veins, and may be compared to a sponge, capable of being filled with blood, and emptied again by pressure and consequent regurgitation. It has been conjectured that it is intended as a sort of reservoir of blood to assist in the work of digestion: so that when the stomach becomes full of food, by pressing on the spleen, it should in a manner empty that organ in a certain degree, and thus cause the blood to be more copious in the vessels of the stomach, at that precise time when it is required for the purpose of secreting the gastric juice. But though this is a good conjecture, it has never been clearly proved.

To recapitulate then, we may say the digestive organs consist of the alimentary canal and its appendages—that is, the mouth, the throat, the stomach, the duodenum, and the rest of the small intestines; and lastly, the large intestines: the auxiliary appendages to this canal being the liver, the spleen, and the pancreas.

The food masticated in the mouth is swallowed by the peristaltic motion of the throat, digested in the stomach, and converted in the small intestines into chyle, by the agency of the organs already described, and the residue, changed into a peculiar modification of matter called feces in the larger bowels, is eventually expelled.

On the due performance of all these functions may health and strength be said to depend, and from the various species of derangement to which in artificial life they are necessarily more or less liable, arise many of the sympathetic maladies to which the human frame is subject.

Irregularities of diet, slothful habits, bad air in close and confined apartments, the epidemical influence of peculiar atmospheres, contagion and other casualties, as well as original malformation and the predisposition to disease entailed by parent constitutions on posterity, may be said to comprehend the great compound sources of diseases, and all of these act more or less on the digestive organs, by the reaction of which, on the other parts of the body, disorders, both atmospherical and hereditary, which would otherwise be passing or trivial, are so aggravated as to destroy the constitution by degrees, to sap the power of enjoyment, and by producing premature decay, accompanied by the most loathsome diseases, to render death painful, lingering, and unnatural. A more strict attention, therefore, than is usually paid to regulate the important functions of these organs, seems necessary for the maintenance of health, for the alleviation of casual diseases, and for giving to our mortal fabric the best chance of arriving at a period of life, which but for moral and physical evils of our own bringing on, ought not to be less cheerful and happy than that at which we commenced our career of existence.

§ 4.—*Summary View of the apparent Symptoms of Disorders of the Digestive Organs.*

Although we soon become acquainted with the disordered state of our digestive organs in some cases, by the pain and uneasiness they occasion, as for instance in cholera, colic, inflammation; yet there are other and less obvious disorders of those organs, which frequently escape the notice of the patient till they have gone on sufficiently long to occasion great mischief in the animal economy. For this

reason I shall here endeavour succinctly to point out to the notice of the reader, certain signs of disorder in the stomach, bowels, and liver, by attending to which in time, we may often prevent the occurrence of diseases of greater magnitude.

When the tongue be white or furrowed on its upper surface, or where there be a bitter or otherwise unnatural taste in the mouth in the morning before breakfast, we may rest assured, however well we may think ourselves, that the stomach, either from indigestion or some other cause, is irritable and out of condition ; I know of no more certain sign of a disordered stomach than this. Persons who have the care of a family should observe the surface of the children's tongues the first thing in the morning, particularly when they are in the least degree indisposed, as some trifling indigestion, always indicated by the state of the tongue, is frequently the beginning of very serious disorders. By remedying this incipient evil in its early stages, by small doses of opening medicine, I believe many children might be saved from tedious and often fatal diseases.

The next symptom of disorder to which it will be proper to allude, is that feeling of uneasiness in the stomach after eating, which really arises from indigested food. This symptom usually, but not always, accompanies the one before described. When the meal has been too copious, or the food of a quality which does not agree with the patient's particular constitution, this sensation is generally experienced, and is often followed by nausea. We ought to take notice whether all food produce it, or whether the sensation only occurs after eating particular kinds of aliment, in order that in the latter case the obnoxious article of diet may be avoided.

When simple indigestion of the above described kind occurs, unattended by any particular symptoms of disease, it may generally be removed by small doses of rhubarb, taken an hour after dinner. By lessening the quantity of our food, and by adopting the several salutary habits described in the ensuing section. it may be avoided.

The following is a good family pill for ordinary cases of indigestion and constipation of bowels :—*Three grains of rhubarb, and two of soccotrine aloes*, made into a pill, and taken half an hour before dinner, each day. I have known this pill, when persevered in and combined with a little abstinence, restore apparently very disordered stomachs.

When the excrements are not of a natural colour and consistency, it indicates the defective performance of the subsidiary processes of digestion which occur in the bowels; the most important perhaps of all these is the function of the liver. If the excrements be not duly coloured of a deep yellowish brown, we should regard some defect in the bile as the cause of the discolouration, and should have recourse to small doses of mercury, or of calomel and aloes. For it is by the bile that the feces are coloured : colourless or pale feces, therefore, show that the secretion of bile is deficient, while green, black, and other discoloured stools, indicate an unnatural secretion of that fluid. In either case, the state of the liver becomes the object of attention, and, as the most distressing nervous symptoms frequently arise from a disordered liver, so may we often, by the timely application of simple remedies for the disorders of that organ, avert calamities of the most important nature, both mental and bodily. All this will be more fully treated of in the sequel, but the extreme importance of a healthy liver rendered it advisable to preadmonish the reader to pay the most scrupulous attention to the signs of disorder in that viscus.

When to indigestion any of the abovementioned signs of defective or vitiated bile appear, *five grains of the blue pill* may be taken every alternate night, and a draught of the *infusion of gentian, with senna, and the tincture of cardamum*, an hour before dinner. In case of this medicine not agreeing with the patient, any substitute may be employed which custom has reconciled to the constitution ; as cascarilla, and so on. In many cases vegetable diet

drinks prove beneficial, by tranquillizing the irritability of the stomach.

Before I close this section I feel disposed to repeat that medical practitioners, hospitaliers, or parents of families, cannot be too particular in the examination of their patients, or children, as to the state of the digestive organs. Persons have frequently come to me complaining of various disorders of health, telling me, at the same time, that their stomach and bowels were right enough; when on subsequent examination I have found almost every symptom of disordered digestive organs. And I have been repeatedly successful in removing by simple remedies which act chiefly on those organs, many local diseases that have resisted all the ordinary means of cure derived from topical specific remedies, which nevertheless appeared to be sanctioned by the long established custom of the profession. It is almost incalculable what a number of ills may be prevented by timely attention to the digestion, when combined with temperance.

Various pills are vended by patent, the principal ingredients in which are aloes, rhubarb, and other purgative substances, combined with a little calomel. Many of these pills are very useful, inasmuch as by keeping the bowels open they carry off the ill effects of habitual intemperance, and prevent dangerous accumulations of feces in the bowels; but we should do better to avoid than to correct evils; and after all it is on healthy habits, superinduced by rules of conduct with respect to diet, air, and exercise, that we must depend for the permanent maintenance of health.

Habit has been called second Nature, and we are reconciled by custom to many practices that would at first be felt as injurious. Man seems to have a much greater power of adapting his constitution by habits to various and dissimilar circumstances than most other animals possess. Nevertheless there are certain rules of conduct which in almost all constitutions are found to conduce to health, while the neglect of them, predisposes more or less to disorders. The mode in which predisponents to disorder are

usually produced, consists in the power of bad habits to derange the actions of the digestive viscera, and to irritate and debilitate the nervous system. It is then that various diseases will arise, even in the absence of specific pestilence, according to the hereditary tendencies of different constitutions, as soon as any exciting cause is brought into action. It is proposed in the sequel to point out what rules of diet are most conducive to health, in order that those who have weak and irritable constitutions may avail themselves of them : at the same time the most healthy may adopt them with additional advantage and security.

§ 5.—RULE 1.—*Of the Quantity of Food requisite.*

The first rule of health is that which prescribes moderation in diet. It is essential that the patient guard against eating more than the animal system requires for its daily support : the surplus of food does not well digest, but generally remains imperfectly acted on by the juices of the stomach and bowels, and becomes a source of irritation. In other cases, where the digestion is very powerful, repletion acts injuriously in another way, by overloading the sanguiferous system, and thereby aggravating all the predispositions to disease, and often leading to such violent actions of the blood vessels as occasions immediate death, of which apoplexy is one striking example.

People form very erroneous notions of the quantity of food requisite, and too often imagine themselves safe from the consequences of repletion, merely because it does not immediately exhibit its baneful effects.

Mr. Hunter used to say, that most people lived above par, which rendered the generality of diseases or of accidents the more difficult of cure.

Children are very erroneously treated with respect to diet ; those who are early accustomed to do with a little, are sure to feel the benefit of it, the whole of their lives ; and in

cases of weakly and irritable young people, it is particularly injurious to endeavour to force their already weak stomachs by too much nourishment.

We may often illustrate opinions by examples drawn from extreme cases ; in the case of diet, examples of such extreme moderation may be adduced, together with its salutary effects, as would astonish most well fed citizens.

The Carmelites, and some other Monastic Orders, afford wonderful examples of the beneficial effects of abstinence. Hermits and Anchorites, in despite of their sedentary and other austere habits, have attained to a great age, in consequence, as it would seem, of their simple and scanty food. Where such simple diet has been combined with the other wholesome habits, described below, the consequences have sometimes been prodigious longevity. Old Parr is said to have been very abstemious, and old Jenkins, as we are told by his epitaphographer, was an instance of the health and length of days which is insured to those who observe uniform temperance during a hard life of bodily labour conjoined with ease and serenity of mind.



§ 6.—RULE 2.—*Of the Quality of our Food.*

Next to the quantity of food we ought to consider its quality. Some aliments are generally wholesome, as fresh meats, farinaceous vegetables, fruits and pulse of all kinds ; while fatty and oily substances, grease, swine's flesh, and some sorts of vegetables are commonly injurious. Independently of the general wholesomeness of some and the unwholesomeness of other articles of diet, there are particular persons who, from peculiarity of constitution, cannot eat certain sorts of food without being almost immediately seized with illness. Many people cannot eat honey ; others are injured by butter. Dr. Gall, the celebrated anatomist, could never digest mutton. I knew a man who could eat anything but beef ; and it is well known that numerous per-

sons, and myself among the number, cannot eat pork, under any modification of cookery whatever. The smell of a cut cucumber is, to some, the most offensive odour in the world, while to other persons it is refreshing and delightful. I knew a lady in whom honey produced violent convulsions as soon as it was swallowed ; and there are instances of persons who cannot sit in the room with cheese without being ill. There are others who know immediately of the presence of a cat in the room by some acute power of smelling, and who feel immediately unwell. All these and many other peculiarities are referred to what is called idiosyncrasy. Those who are conscious of any such peculiarities should scrupulously abstain from articles of food which disagree with them, and avoid substances whose smell is offensive, in defiance of the foolish solicitations of ignorant people to overcome them, who would feign persuade all who differ from them in taste to accommodate themselves, by force, to circumstances which nature shows to be discordant to their constitutional feelings.

But though morbid aversions should be yielded to, it is a question how far on the other hand morbid appetites should be indulged : no one should be indulged in a craving to eat chalk, sand, and other indigestible things. Nevertheless in particular cases of this kind nature seems to point out an extraordinary remedy for some extraordinary state of disorder. Instances have been known where the indulgence of unhealthy pregnant women, as well as of other patients in the gratification of morbid appetites, has been attended with singular advantage.

In the generality of persons who are not the subjects of these irregular desires, a salutary choice of aliments may be made and laid down as a rule. A small quantity of the more wholesome meats, if well dressed, as beef, mutton, game, and the domestic fowls ; of farinaceous vegetables and puddings, with most sorts of ripe fruits, may be said to form the best ingredients of diet. People err very much, now a days, in giving children too much animal food. It may appear to agree well with them for a time, but is un-

doubtedly bad in the end, and I am convinced that for young people, and especially those of sanguine temperaments, a very small proportion of animal food is necessary, and that the least habitual excess in this particular will encrease the liability to disease, and enhance the danger from the occurrence of any of those epidemics to which they are subject.

There are persons, who to avoid too much meat, give their children, and even take themselves, too large a quantity of vegetables, thus falling under Scylla, in order to avoid Charybdis. Now all this is a great mistake; a heavy dinner of vegetables will produce more temporary, though less permanent inconvenience, than an overcharge of meat. The rule should be a moderate quantity of each, and it would be well if young persons were brought up to abstain from animal food, an additional day in the week, for the sake of health. Meat can never be eaten by children more than once in the same day with advantage, and it would be better if adults could confine themselves to it at dinner alone.

§ 6.—RULE 3.—*Of the Periods of Meals.*

The times of taking food is what next claims our attention. Artificial habit has appointed regular hours of meals, and this seems quite conformable to the human constitution. The stomach better digests a meal at the usual hour, owing to a kind of preparatory expectancy which is created by habit, and persons with weak health find, when they are obliged by circumstances to eat at irregular times, that imperfect digestion is the consequence.

Three meals in a day are quite enough for anybody, and many grown persons find two to be amply sufficient, not considering tea as a meal any more than coffee, but rather making it a pleasant diluent to a previous dinner.

One should be careful not to drink much at dinner even of pure water. Mr. Abernethy used to recommend not drinking with meals at all, and called hunger and thirst incompatible sensations. This is, perhaps, carrying the

notion too far, but I have always remarked that persons in the best health require no drink at dinner—a cup of coffee and a small glass of liqueur after dinner is enough—and I am persuaded that wine, beer, and spirituous liquors, in general at dinner are injurious, except in a very moderate quantity. Indeed at all times the excessive stimulus of much fermented and spirituous liquors ought to be avoided: it is a fertile source of disorder. Good wines are found to be less injurious than bad, and the light French and Rhenish wines are perhaps the most wholesome, whenever they will agree with the stomach. All eating and drinking between meals is excessively bad, as it disqualifies the stomach for the office of digestion.

After meals, particularly after dinner, a state of rest is advisable; those who are forced to stir about and walk much, soon after dinner, often hurt their stomachs by so doing. All the carnivorous animals lie down and rest after a full meal; and nature soon convinces those persons who try the experiment, of the great comfort and advantage of yielding to our inclination to rest quiet during the process of digestion. Exercise, so beneficial, and indeed so necessary to health when taken at seasonable hours, becomes a source of indigestion and consequently of numberless diseases, if taken when the stomach is full. To prove this fact, Morgagni fed two dogs, after which he hunted one and let the other lie at rest. At night both were killed and dissected: in the stomach of the former the food was still to be seen undigested, while from the stomach of the latter the natural process of digestion had removed the whole of its contents. Indulgence in any of the more violent passions, after meals, is also very injurious, and has often been followed by sudden death.

It ought to be laid down as a rule of conduct for all persons who are in any degree out of health, and particularly the dispeptic, to sit quiet, at least two hours after dinner, and, if possible, in cheerful society; since agreeable affections of the mind, at or after the time of eating, promote

good digestion; and the custom of company at meals has, perhaps, had its foundation ages ago in the knowledge of this fact. If, however, a disposition to sleep after dinner be felt, there is no reason why it should not be indulged in: neither is coffee nor the smoking of an afternoon pipe of tobacco the least injurious, as some persons have vainly imagined. As pleasant sedatives, where they agree with the patient, they are rather to be recommended than condemned.

Scholars, particularly children, should be allowed their hour of play out of doors *before* dinner, and of quiet recreation *after* it: labour would come easier the rest of the day.

§ 7.—RULE 4.—(*Of Exercise and Early Rising.*)

Exercise and good air come next to be considered, comprehending the very salutary habit of early rising, and taking the fresh air of the morning. The old proverb which recommends getting up with the lark is founded on good sense, and has received the sanction of a long experience in its favour. Whether it be that certain active persons, constructed at all events to be long livers, have got up early from the native activity of their constitutions; or whether early rising actually possesses the healthy influence that is ascribed to it, facts are wanting to determine; but certain it is, that of an enormous catalogue of persons who have attained to a great age, of very dissimilar habits in other respects, a very large proportion have been early risers.

Those who ought to be well, should never omit exercise; few people employ it sufficiently as a medical agent. In cases of nervous and dyspeptic disorders, a degree of it, at other times producing lassitude, has been known to restore the parties to health.

If few persons know the advantage of exercise, still fewer understand the benefit of good air. Ventilation of rooms too, is apt to be neglected, particularly in winter. The flywheels, called ventilators, are good things for close apart-

ments. The diseases of manufactories and gaols are in a great measure produced by foul and stagnating air.

The subject which would next present itself in the natural order in which I have been considering the sources of health and disorder, comprises the various effects of the mind on the constitution. Mental depression, anxiety, and grief, originating in external causes, have a tendency to disorder the brain and nervous system, and the most calamitous states of general bad health often arise from such as are called mental causes. I shall content myself with advising that, whenever the digestive functions and general health be disordered, a more than ordinary attention ought to be paid to the state of the patient's mind : all causes of trouble and vexation should be removed as much as possible, while those which produce mirth, or conduce to ease of mind, are strongly to be recommended. On the other hand, when from business or other causes, perplexity or depression of mind becomes unavoidable, the greatest care should then be taken of digestion, the food should be light and scanty, all strong drinks avoided, and the sedatives resorted to ; for when once anxiety and indigestion begin to operate on each other reciprocally, constitutional melancholy and hypochondriasis are apt to be the consequence.

§ 8.—RULE 5.—*Of Fasting and Abstinence.*

I come now to the consideration of practices which operate both on the body and on the mind, fitting us, in a high degree, for corporeal and intellectual exertion, and preparing us for meditation on the most profound subjects of human speculation. I do not mean to detract from the religious merit of penitential fasting and austerity, when I assert that these salutary observances may be rendered as useful to the bodies of those who are attached to the table, as they are to the minds of those who are devoted to the altar. For I can see no reason why both objects should not be blended together ; since one great effect of abstinence

and fasting is to set the body free from temptations to indulgence, and to relieve the organs of sense from oppression, and thereby to render the mind of the penitent more fit for the exercise of devotion ; nor can I help thinking that this double object was originally contemplated in the institution of fasting, since it is a custom which has prevailed more or less in almost every country, not being confined to Christianity, but being found, combined with ablutions and other wholesome practices, among Musselmén, Jews, Indians, and indeed almost every nation of antiquity.

The proper employment of exercise is a great assistant to fasting, for by walking before dinner we prepare the stomach for our meals, and digestion is better performed. It is a wise regulation of some of the reformed Orders of St. Benedict to enforce a daily portion of bodily labour. The bath, too, is always a useful and cleanly habit : we do not use warm baths often enough in these latitudes.

I am convinced by the most elaborate researches into the subject, that there is a very close connection between corporeal austerities, and power of mind : both have flourished, and both have declined together ; they have gone hand in hand in past times, signalised by the most stupendous energies of science, learning, and sanctity ; and the frivolous age in which our lot is cast, affords a melancholy example of their cotemporary destruction. But I shall confine myself here to the medicinal utility of such practices.

I would observe in the first place that if our fasts had been ordained by a council of physiologists, they could not have been better ^{at digesti} adapted, and adapted to the necessities of the case, than they are at present.

The two days of abstinence prescribed by the Christian church, in each week, will by all be admitted to be sanitary : occasional abstinence is known to be better than habitual low feeding ; it affords to the stomach a useful alterative from our customary heavy food. This periodical restorative is a great improvement on ordinary temperance ; and it is best done where it is done in the completest manner, by making

a very light tea meal instead of a dinner. *This may not suit everybody, but it is well adapted for those who might otherwise be tempted to risk the indigestion of a full watery dinner of fish and vegetables. Others might take the light sorts of puddings with advantage, but I am persuaded that people in general who complain that they cannot abstain, are beguiled into this belief, by mistaking the means : they should diminish the quantity as well as change the quality of their food, and then even the less digestible sorts would have a greater chance of being overcome by the gastric powers. Another important fact may be mentioned with respect to abstinence—that where the vegetable diet seems to disagree, the popular pills of rhubarb and ginger, now kept prepared in every shop, may be taken with great advantage an hour before dinner. Where the bowels become costive, a pill composed of five grains of rhubarb and two grains of aloes may be substituted. Persons who have weak stomachs, or particular antipathies, should try a variety of things till they find what agrees with them best. A change in diet is better than living too much on one thing ; and thus we see why if a constant diet of vegetables were injurious, such a diet occurring periodically, would be a salutary alterative, even if its imaginary inconvenience were really greater than it is.

Fasting is a greater trial than abstinence, and therefore it has been recommended not to fast on one meal a day, nor to go twentyfour hours without food as the Jews do, but to eat a small quantity of bread, biscuit, or something solid for breakfast, and if wanted, the same again at tea, having had a satisfactory repast at dinner. I believe by a combination of fasting with abstinence to be a very good thing, and to be very useful to those whose affluence enables them on ordinary occasions to live well. I shall now say a few words on the periods of the fasts ; for they seem to me to have been judiciously selected and fixed for those times of year when they would be the most beneficial. And first of all, the Lenten Fast occurs at a time when, in all ages, depletion has been

reckoned desirable, and for many persons necessary. After this fast got into disuse at the "Reformation," the habit of bleeding, in the spring and fall of the year, became very general. But surely this unnatural mode of lowering the system, by draining away the fluid of life, cannot be so salutary as the milder method, by diminishing the quantity and lightening the quality of our food, accompanied, as it ought occasionally to be, by mild opening medicines, taken at intervals, or according as necessity may require.

Some few persons, from habit, cannot fast without assistance; but I will venture to say, from past experience, that I could enable ninety nine out of every hundred to do it, not only with safety, but with advantage, by examining first their constitution, and then modifying their food and medicines accordingly.

• As the Lenten Fast is a useful alterative in spring, so is the little Fast of Advent a good substitute for the old silly custom of bloodletting again in autumn. It prepares us likewise for the feasts of Christmas and Kingtide, just as Lent does for those of Easter and Whitsuntide, and we enjoy the return to the festive circle round the wassail bowl ten times more than the puritan does, whose gloomy and imaginationless mind exhibits, in its never varying dullness and density, the effects of the gross food which he lives on all the year round.

When Sir Isaac Newton was writing his *Principia*, he lived on a scanty allowance of bread and water, otherwise he would not have achieved his undertaking. What are the literary productions of the present day, compared with those of our ancestors, who practised fasting and austerity? Our boasted March of Intellect is become rather the Fandango of Frivolity. Literature and Science are now less intensified, though more expanded than formerly, and I ween, to use the poet's phrase, that one page of sterling mediæval metal, fustled out into modern brass, would fill volumes of trifling tracts and pennyworth's of learning. It was the abstinence, fasts, and rigorous discipline of our

ancestors, that rendered the native genius of their great men an available fountain of knowledge. St. Jerome, St. Basil, Tertullian, and other primitive writers, have therefore been justly eloquent on the subject of these salutary austerities.

The high average longevity and healthy old age of the Carmelites, the Trappists, and some other religious orders, who observe the more severe fasts and abstinences, show that such practices conduce to permanent strength, free us from that premature decrepitude and loss of sense, which are the only circumstances that a virtuous and strong mind would ever loathe on the approach of death, and insure us, *volente Deo*, all those delights, even to the last, which Cicero seems by his book *De Senectute* to have been so nervously anxious to believe in. Some false reasoners adduce the case of old drunkards, to prove that debauchery is not the cause of disease. But these are rare instances, and a closer enquiry will convince any one, that redundant stimulus and repletion in youth, is the cause why so few live to the natural term of life. Cornaro, who only began a course of temperance at forty years old, reached a prodigious age by perseverance in it.

Some men seem, like moral incendiaries, so to ventilate the lamp of life as to fire every part of their microcosm with destructive inflammation; while others replenish it sparingly with the oil of temperance, and to them the flame burns steadily and shines to the end. This brings to my recollection two cases in question, contained in stories I have read years ago, in some old latin writers, but in both of which, I remember, from an analytical habit of resolving every thing into cause and effect, I soon saw the same principle manifested, which guarantees to youth by austere discipline, not deprived of the faculties which are able to render it a season of pleasure. One story was that of an old philosopher who is telling his pupil that never having vitiated his taste with the Dionysian bowl, the honey of Hybla was still sweet to his aged palate. The other story was that of an aged pilgrim, whose sparkling eyes, hollow but cheerful visage, and perfect senses, showed that his mind had outlived the tattered fragments of

his sinewy carcass ; he was in his cell in a wilderness, with a cross and a bell on the top of it, a taper, and a rosary and a missal in his hand. And how have you learnt to look so happy in the evening of your days, said a passing knight, at a time when sable clouds skirt the brow of less wayworn palmers ? Gentle knight, quoth the pious votarist, as I have made the uphill way of life the thorny path of Calvary ; so the rays of Tabor now beam on my descent into the grave.

The ancient fathers tell us that abstinence fortifies us against the fire of temptation by cooling the blood ; no wonder therefore that they should bestow on it such lavish encomium. Ought not then modern physicians to be equally loud in its praise, since abundant facts prove its power to guard the body against epidemic disease itself, and to enable us to discharge our duties fearlessly in the most dangerous cases of fever.

As I hope before long to publish, in a more expanded and popular form, some practical observations on the mode of preserving health under different circumstances of life, I shall at present conclude, by advising those who intend to avail themselves of the hints here thrown out, that it is by perseverance in good rules alone that they can attain to secure health. Many are willing to get relieved, when they are ill, who will not take the trouble to preserve health which they have purchased, at the expense of comfort, by a disagreeable course of medicine, and thus they go on rolling the stone of Sisyphus, and getting ill and well by turns till the constitution gives way. Those follow the wiser course who, by a judicious use of temperance, by periodical abstinence, by the occasional use of mild aperient medicines, a state of body, more adapted to weather out the storms of adversity, while it renders prosperity a source of permanent enjoyment.

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